



BehavRec: Workshop on Recommendations for Behavior Change

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ABSTRACT

The workshop aims to discuss open problems, challenges, and innovative research approaches in the area of persuasive and behavior change recommender systems, that is, recommender systems aimed at modifying people’s habits and behavior. Some questions that motivate this workshop are: What kind of theory is more suitable to inform the design of behavior change recommender systems? What kind of personal data (e.g., coming from environmental sensors, wearable devices, etc.) should we use to design behavior change recommendations? How should we deliver them (i.e., what kind of communication channels and interfaces should we use)? What kind of strategies should we implement to design timely and contextualized recommendations? How can we support the user’s motivation to adhere to the recommendations provided? How can we “persuade” users in the long term?

CCS CONCEPTS

• **Information systems** → Information retrieval; Retrieval tasks and goals; Recommender systems.

KEYWORDS

Recommender systems, Behavior change, Persuasive technologies

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1 INTRODUCTION

For solving a variety of personal and societal problems, changing human behavior is crucial. Persuasive and behavior change systems are intentionally designed to support people to achieve behavior change objectives. They can be applied to various domains including personal health and wellness, safety and security, environmental sustainability, education, and politics. Research in

this area has advanced over the years attracting interest from both practitioners and researchers due to the increasing realization of the important role interactive technologies can play in assisting and motivating people to achieve their own goals. In particular, personalization of persuasive and behavior change systems may increase their relevance, motivational appeal, user experience, and hence their overall effectiveness at empowering and assisting people to achieve their goals. In this context, the interest in behavior change recommender systems, which provide users with personalized suggestions on how to modify their behavior and habits, for example, toward more healthy lifestyle, has considerably increased in recent years [3, 4, 6, 7, 9, 14].

According to a recent claim by IBM, 90% of the data available today have been created in the last two years. This exponential growth of digital information has given new life to research in the area of recommender systems: a variety of information about users, such as data describing their physical and psychological states, can now be obtained from many heterogeneous sources, and then used to deliver novel forms of personalized services. In this landscape, novel opportunities for providing recommendations aimed at changing behavior arise. Recommender systems can now exploit different personal data of the user. For example, data from medical records, eating habits, physiological parameters, and psychological states, etc. can be collected by ubiquitous computing technologies, enabling novel forms of tailored suggestions that may be delivered anywhere at any time, leveraging multiple technologies (e.g., natural language processing) and different devices (e.g., ambient, wearable and mobile devices), potentially impacting every domain of people’s daily life.

However, behavior change is a complex research field, as modifying habits is difficult and often people relapse into their previous routines. Many current interactive applications appear to fail in providing long lasting change in behavior due to ineffective forms of “persuasion” that are not able to sustain the behavior change effort over time. On the one hand, behavior change requires consideration of elements that may differ across individuals, such as physical and mental states, skills, goals, risk factors, preferences, as well as of the fact that behavior change interventions have to be adjusted over time as the person progresses through the process of change [11]: in this sense, recommender systems exploiting the user’s personal data could provide tailored suggestions that may increase the likelihood of the effectiveness of the intervention [15].

On the other hand, however, the complexity of a behavior change recommender system is greater than that of other kinds of recommenders, due to the need of considering diverse contextual factors

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and incorporating multiple components for tracking, interacting, and personalizing: a pervasive behavior change recommender system monitors user behavior, such as mood and physical activity, considers user preferences to tailor recommendations, and prompts users and keeps them engaged to encourage adherence to interventions [15]. In this context, many theoretical and practical challenges and open issues arise: for instance, it is still not clear what kind of theories should be used to ground the design of behavior recommendations [2, 5, 8, 13], what kind of interfaces and communication channels are more effective in delivering the recommendations, how the system can sustain the person's motivation to initiate the change and adhere to the behavioral program [12], in which contexts (and at which times) the recommendation should or should not be delivered [1, 10], and so on. Moreover, persuasive use of personalization and recommendations is causing increasing ethical and safety concerns about behavior engineering, which may harm human autonomy and wellbeing.

Therefore, in addition to the many opportunities that the current technological landscape provides for the design of novel recommender systems aiming at changing people's behavior, it becomes urgent to discuss the different challenges that behavior change recommender systems should face in the near future. Despite the recent advances, there are many crucial research challenges ready for innovation. The workshop aims to provide a forum for discussing open problems and innovative research approaches in this area. Some questions that motivate this workshop are: What kind of theory is more suitable to inform the design of behavior change recommender systems? What kind of data should be used to design recommendations? How should they be delivered? What kinds of strategies should be implemented to design timely and contextualized recommendations? How to support the users' motivation and help them sustain the desired behavior in the long term? What contextual factors may affect the effectiveness of recommender systems and should be considered in design?

The workshop will give RecSys participants the opportunities for exploring key theoretical and practical issues in the field of behavior change recommendation. Moreover, it will complement the main conference by providing a forum where people coming from different disciplines (computer science, human-computer interaction, psychology, etc.) can discuss their different perspectives, potentially leading to insights for the field of behavior change recommendation.

Topics of interests include but are not limited to:

1) Recommenders Systems: Behavior change recommender systems for health, wellness, safety, sustainability, etc.

2) User Interfaces for behavior change recommender systems: Visual interfaces - Context-aware interfaces - Ubiquitous, wearable and mobile interfaces - Conversational interfaces

3) New approaches to designing and delivering behavior change recommendations: Controllability, transparency, and explainability - Persuasive recommendation (e.g., argumentation-aware recommendation) - Cultural differences (e.g., culture-aware recommendation) - Context-aware recommendation - How to balance the cost and benefit of behavior change recommender systems - Challenges and limitations of implementing behavior change recommender systems

4) Ethics, Privacy, and theories: Theories of behavior change - How to develop ethical and privacy-sensitive behavior change recommender systems - Frameworks and models for developing personalized persuasive technology - Objective and subjective approaches to behavior change recommendations

5) Evaluation: Empirical studies and evaluations of recommender systems for behavior change - Evaluation methods and metrics (e.g., evaluation questionnaire design) - Case studies and examples of behavior change recommender systems - Success and failure stories with regard to behavior change recommender systems - Long-term evaluation and evidence of long-term effects of behavior change recommender systems.

2 WORKSHOP ORGANIZERS

The organizers have different expertise and their main research interests pertain to different research areas so they can attract diverse participants belonging to different communities.

Amon Rapp (main contact) is an Associate Professor at the Computer Science Department of the University of Torino, where he leads the Smart Personal Technology Lab. His main research areas are self-tracking and behavior change technologies, video games and intelligent agents investigated from an HCI perspective. He organized several workshops in prestigious conferences like UbiComp/ISWC, CHI Play, Hypertext, and UMAP. He published more than 100 papers in international conferences and journals. He is an associated editor of the International Journal of Human-Computer Studies (Elsevier) and Human-Computer Interaction (Taylor & Francis).

Federica Cena is an associate professor at the Computer Science Department of the University of Turin (<http://www.di.unito.it/~cena>). Head of "Smart City Lab" of academic center ICxT (from October 2015) (<http://www.icxt.unito.it/>) She works on the intersection of Artificial Intelligence and Human-Computer Interaction. In the last years, she is mainly devoted to studying the implications of Internet of Things for user modeling and personalization, with a special focus on assistive applications for cognitive disabilities and frailty. She is the author of more than 100 scientific publications at conferences and in international journals. She organized several workshops in prestigious conferences like UbiComp/ISWC, CHI Play, and ACM UMAP.

Christoph Trattner is a Full Professor at the University of Bergen and the Founder and the Center Director of the Research Centre for Responsible Media Technology & Innovation - SFI MediaFutures worth around 26 million EUR. He is also the Founder and Leader of the DARS research group at UiB and holds a 10% Research Professor (Forsker I) position in NORCE (NKLM, department of Health) one of Norway's largest research institutions. He positions research in two central specializations in the Information Science research field. The first is "Behavioral Data Analytics" and the second is "Recommender Systems". Since 2009, he published over 100 scientific articles in top venues about his work and acquired over 54 million Euros in funding on European and (inter) national level - 30 million as the PI.

Dr. Rita Orji is a Canada Research Chair in Persuasive Technology and an Associate Professor of Computer Science at Dalhousie

University, Canada, <http://ritaorji.com/>. She is well-known for her work in the area of Personalizing Persuasive Technology and has published over 200 peer-reviewed papers in this area. Her work has won several awards, including best paper awards. She has many years of experience serving on organizing and program committees conferences. Dr. Orji has successfully co-organized many workshops, including organizing the Personalizing Persuasive Technology Workshops, Personalization in Serious and Persuasive Games and Gamified Interactions Workshop, and Positive Gaming: Workshop on Gamification and Games for Wellbeing.

Julita Vassileva is a Professor of Computer Science at the University of Saskatchewan. Email: jiv@cs.usask.ca, homepage: <https://julita.usask.ca>. She co-directs the MADMUC Lab which explores personalized and social computing systems with applications in human learning, health, and behavior change. She has organized many workshops at UMAP on UM in Information Retrieval, Trust and Reputation Systems, and on Adaptive and Personalized Persuasive Technology. She was program co-chair of UM in 2001 and general co-chair of UMAP'2016.

Dr.ir. Alain Starke is an assistant professor in persuasive communication for a digital society, at the University of Amsterdam, Netherlands. He is also an adjunct associate professor in recommender systems at the Department of Information Science and Media Studies, University of Bergen, Norway, being part of the SFI MediaFutures research center for responsible media technology. His research focuses on developing recommender systems that support preference shifts and behavioral change in domains of self-actualization, such as energy conservation, healthy eating, and news recommendation. He is a multidisciplinary human-computer interaction scholar, with a track record in computer science, energy, and food science journals, as well as having talks and papers at multiple ACM conferences, such as IUI, UMAP, and RecSys.

3 DESCRIPTION OF WORKSHOP ACTIVITIES

The workshop will start with the presentation of the accepted papers through a presentation-madness session in which each participant will have 5 minutes to present her research. This phase is aimed at generating insights for the subsequent phase of discussion. Then, we will discuss main open issues in behavior change recommender system research area, starting from the insights gained from the paper presentations: this phase will eventually lead to the definition of a series of design challenges. Subsequently, participants will be split in groups and each group will focus on a design challenge identified during the previous phase: they will have to turn such challenge into a design opportunity. Participants in each group will first work individually to generate new ideas related to the challenge to be addressed. They will be requested to sketch a variety of concepts in a short time span. After 10 minutes, they will present their ideas to their group companions, who will in turn discuss and constructively criticize them. Then, each group will collaboratively choose the best idea and develop it into one or more strategies that aim to address the challenge. These could work as “design strategies” for scholars and practitioners to be shared

and used in the development of novel recommender systems for behavior change.

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