

Workshop on Explainable User Models and Personalised Systems (ExUM)

Cataldo Musto
cataldo.musto@uniba.it
University of Bari Aldo Moro
Bari, Italy

Marco Polignano
marco.polignano@uniba.it
University of Bari Aldo Moro
Bari, Italy

Amra Delić
adelic@etf.unsa.ba
University of Sarajevo
Sarajevo, Bosnia and Herzegovina

Amon Rapp
amon.rapp@unito.it
University of Torino
Torino, Italy

Oana Inel
inel@ifi.uzh.ch
University of Zurich
Zurich, Switzerland

Giovanni Semeraro
giovanni.semeraro@uniba.it
University of Bari Aldo Moro
Bari, Italy

Juergen Ziegler
juergen.ziegler@uni-due.de
University of Duisburg
Duisburg, Germany

ABSTRACT

Adaptive and personalized systems have become pervasive technologies, gradually playing an increasingly important role in our daily lives. Indeed, we are now used to interacting with algorithms that help us in several scenarios, ranging from services that suggest us music or movies to personal assistants able to proactively support us in complex decision-making tasks. As the importance of such technologies in our everyday lives grows, it is fundamental that the internal mechanisms that guide these algorithms are as clear as possible. The workshop aims to provide a forum for discussing problems, challenges, and innovative research approaches in this area by investigating the role of transparency and explainability in the recent methodologies for building user models or developing personalized and adaptive systems.

CCS CONCEPTS

• **Information systems** → **Personalization; Recommender systems**; • **Human-centered computing** → **User models**; • **Computing methodologies** → **Natural language processing**.

KEYWORDS

Explainability, Explanations, Transparency, Interpretability, User Models, Personalization, Recommender Systems

ACM Reference Format:

Cataldo Musto, Amra Delić, Oana Inel, Marco Polignano, Amon Rapp, Giovanni Semeraro, and Juergen Ziegler. 2022. Workshop on Explainable User Models and Personalised Systems (ExUM). In *Adjunct Proceedings of the 30th ACM Conference on User Modeling, Adaptation and Personalization (UMAP '22 Adjunct)*, July 4–7, 2022, Barcelona, Spain. ACM, New York, NY, USA, 3 pages. <https://doi.org/10.1145/3511047.3536350>

Permission to make digital or hard copies of part or all of this work for personal or classroom use is granted without fee provided that copies are not made or distributed for profit or commercial advantage and that copies bear this notice and the full citation on the first page. Copyrights for third-party components of this work must be honored. For all other uses, contact the owner/author(s).

UMAP '22 Adjunct, July 4–7, 2022, Barcelona, Spain

© 2022 Copyright held by the owner/author(s).

ACM ISBN 978-1-4503-9232-7/22/07.

<https://doi.org/10.1145/3511047.3536350>

'22 Adjunct), July 4–7, 2022, Barcelona, Spain. ACM, New York, NY, USA, 3 pages. <https://doi.org/10.1145/3511047.3536350>

1 INTRODUCTION

The spread of adaptive and personalized systems takes its roots in the recent growth of (personal) data, which has led to two different phenomena: on the one side, the uncontrolled growth of information and the information overload have emphasized the need for systems that support users in sifting this massive flow of data. On the other side, all the data points about the users that are now available (i.e., likes/dislikes, friends, often visited places) have led to the definition of very precise and fine-grained user models, which enabled effective personalization and adaptation mechanisms.

Nowadays, we interact with algorithms that exploit such personal data to support us in various scenarios, such as suggesting music to be listened to or movies to be watched. These personalized and adaptive services are continuously evolving. Furthermore, they are becoming part of our everyday lives, increasingly acting as personal assistants who proactively help us in complex decision-making tasks.

Unfortunately, most of these systems adopt black box models whose internal mechanisms are opaque to end-users. Indeed, users typically enjoy personalized suggestions or like to be supported in their decision-making tasks. Still, they are unaware of the general rationale that guides the algorithms in the adaptation and personalization process. Moreover, the metrics that are usually adopted to evaluate the effectiveness of the algorithms reward those opaque methodologies such as matrix factorization and neural network-based techniques that maximize the accuracy of the suggestions at the expense of the transparency and explainability of the model.

This issue is even more evident considering the EU General Data Protection Regulation (GDPR). The GDPR further emphasized the need and right for scrutable and transparent methodologies that can guide the users to comprehend which information the systems hold about them and which is the internal behavior of the personalization algorithms. The main research question arising from this scenario is simple and straightforward: how can we deal

with such a dichotomy between the need for effective adaptive systems and the right to transparency and interpretability?

This question triggers several important research lines: building scrutable user models and transparent algorithms, analyzing the impact of opaque algorithms on final users, studying the role of explanation strategies, and investigating how to provide users with more control in the personalization and adaptation problems.

The ExUM workshop aims to provide a forum to discuss such problems, challenges, and innovative research approaches in the area, by investigating the role of transparency and explainability in the recent methodologies for building user models or developing personalized and adaptive systems.

Topics of interests include but are not limited to:

- Transparent and Explainable Personalization Strategies
 - Scrutable User Models,
 - Transparent User Profiling and Personal Data Extraction,
 - Explainable Personalization and Adaptation Methodologies,
 - Novel strategies (e.g., conversational recommender systems) for building transparent algorithms, or
 - Transparent Personalization and Adaptation to Groups of users
- Designing Explanation Algorithms
 - Explanation algorithms based on item description and item properties,
 - Explanation algorithms based on user-generated content (e.g., reviews),
 - Explanation algorithms based on collaborative information,
 - Building explanation algorithms for opaque personalization techniques, (e.g., neural networks, matrix factorization), or
 - Explanation algorithms based on methods to build group models
- Designing Transparent and Explainable User Interfaces
 - Transparent User Interfaces,
 - Designing Transparent Interaction methodologies, or
 - Novel paradigms (e.g. chatbots) for building transparent models
- Evaluating Transparency and Explainability
 - Evaluating Transparency in interaction or personalization,
 - Evaluating Explainability of the algorithms,
 - Designing User Studies for evaluating transparency and explainability, or
 - Novel metrics and experimental protocols
- Open Issues in Transparent and Explainable User Models and Personalized Systems
 - Ethical issues (Fairness and Biases) in User / Group Models and Personalized Systems,
 - Privacy management of Personal and Social data, or
 - Discussing Recent Regulations (GDPR) and future directions

2 WORKSHOP GOALS

In the workshop, we investigate the role of transparency and explainability on the recent methodologies for building user models and for developing personalized and adaptive systems.

Some of the questions that the workshop aims to explore are:

- How can we build transparent user models? Can we design transparent data extraction strategies?
- Can we propose new recommendation and personalization strategies to consider transparency and explainability?
- What is the role of explanation algorithms in light of transparent and explainable personalization pipelines?
- Can we introduce explanation strategies in opaque models such as neural networks and matrix factorization techniques?
- What kind of novel metrics can go beyond accuracy and reward more transparent and explainable recommendations?
- Can we think about novel personalization paradigms (e.g., chatbots, conversational recommender systems) that enable a more transparent interaction?
- What is the role of end-users in personalization and adaptation algorithms?

3 ACCEPTED PAPERS

We accepted 7 papers (out of 8 papers submitted).

- (1) Owen Chambers, Robin Cohen, Maura R. Grossman, and Queenie Chen in "*Creating a User Model to Support User-specific Explanations of AI Systems*" outline a theoretical user model to increase the explainability of AI systems. The authors propose an approach for modeling a user enabling a decision procedure to reason on how much detail is needed to provide. They also clarify the circumstances under which it is best not to provide an explanation at all.
- (2) Alisa Rieger, Qurat-Ul-Ain Shaheen, Carles Sierra, Mariët Theune, and Nava Tintarev in "*Towards Healthy Online Debate*" tackle the topic of online debates allowing for large-scale participation by users with different opinions, values, and backgrounds. They propose summaries of the arguments made in the debate and personalized persuasive suggestions to motivate users to engage with them to facilitate interaction with online debates, counter confirmation bias, and nudge users towards healthy online debates.
- (3) Mohammed Muheeb Ghori, Arman Dehpanah, Jonathan Gemmill, Hamed Qahri-Saremi, and Bamshad Mobasher in "*Does the User Have A Theory of the Recommender? A Grounded Theory*" describe a Theory of the Recommender, which provides an explanation of how users develop an inherent understanding of how recommender systems work, what their objectives are, and how the user might manipulate them, based on an empirical study and by using a grounded theory methodology.
- (4) Zhirun Zhang, Yucheng Jin, and Li Chen in "*Towards Social Explanations: A Diary Study of Explanations for Recommendations in Daily Life*" report a diary study with five participants on the explanations for recommendations that appeared in participants' daily lives in a two-month period. Moreover, the authors evaluate four typical categories of social explanations and investigate how user contexts and recommender attributes may contribute to good or bad social explanations.

- (5) Cristina Conati in "*Personalized XAI for AI-driven Personalization*" claims that Explainable AI needs to go beyond one-size-fits-all explanations, investigating AI systems that can personalize explanations of their behaviors to the user's context and specific needs. The author summarizes existing research and results toward personalized XAI, focusing on the role of long-term user traits for personalization, and discusses directions for future research.
- (6) Marco Polignano, Giuseppe Colavito, Cataldo Musto, Marco de Gemmis and Giovanni Semeraro in "*Lexicon Enriched Hybrid Hate Speech Detection with Human-Centered Explanations*" propose a system capable of supporting moderators of social network services in the context of hate speech by providing them with a list of possible hate textual contents identified as hate speech by an artificial intelligence system. Moreover, the system supports the human decision by also providing a human-like message able to explain the decision taken by the platform. To this aim, they use hybrid deep learning techniques, which merge information based on information manually annotated in lexicons and that automatically emerged from the data.
- (7) Mouadh Guesmi, Mohamed Amine Chatti, Laura Vorgerd, Thao Ngo, Shoeb Joarder, Qurat Ul Ain and Arham Muslim in "*Explaining User Models with Different Levels of Detail for Transparent Recommendation: A User Study*" present a transparent Recommendation and Interest Modeling Application (RIMA) providing interactive, layered explanations of user models with three levels of detail (basic, intermediate, advanced) in order to meet the needs of different types of users. They then study the effects of personal characteristics and level of detail on the users' perception of user model explanations. The study results show the interaction effects of personal characteristics and level of detail on the perception of explainable RS explaining the user model.
- **Amon Rapp** – Assistant Professor at the University of Torino, Italy, where he leads the Smart Personal Technology Lab at ICxT. His research focuses on how people interact with self-tracking technologies, wearable devices, video games, gamified applications and behavior change systems.
 - **Giovanni Semeraro** – Full Professor at the University of Bari, Italy, where he leads the Semantic Web Access and Personalization (SWAP) "Antonio Bello" research group. His research interests include AI, recommender systems, intelligent information access, semantic and social computing, the Semantic Web, NLP, machine learning, eXplainable AI and personalization.
 - **Jürgen Ziegler** – Full Professor at the University of Duisburg - Essen where he directs the Interactive Systems Research Group. His main research interests lie in the areas of human-computer interaction, human-AI cooperation, recommender systems, information visualization, and health applications.

4 ORGANIZATION

- **Cataldo Musto** – Assistant Professor at the University of Bari, Italy. His research focuses on the adoption of natural language processing techniques for semantic content representation in recommender systems and user modeling platforms.
- **Amra Delic** – Assistant Professor at the University of Sarajevo, Bosnia and Herzegovina. Her research focuses on personalized systems that support group decision-making processes by exploiting various user, group, and interrelationship features and on investigating the role of explanations in group recommender systems.
- **Oana Inel** – Postdoctoral Researcher at the University of Zurich, Switzerland. Her research focuses on investigating the use of explanations as a means of providing transparency for decision-support systems and fostering reflection in people.
- **Marco Polignano** – Research Assistant at the University of Bari, Italy. His research interests include Recommender Systems, Natural Language Processing, Machine Learning, and User Profiling.