JIIS preface for the special issue on advances in recommender systems

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Abstract

Recommender systems have been successfully applied to alleviate overloaded information and assist decision making in various domains and applications. Recently, several new research directions emerged and novel techniques were proposed to advance the development of recommender systems. In this special issue, we invited authors to submit the revised and extended version of their accepted papers in the track on recommender systems associated with ACM Symposium on Applied Computing in 2020 and 2021. Each submission was reviewed by at least two experts and revised according to the reviewers' comments to ensure the quality of the paper. We hope this special issue can motivate researchers in the area of recommender systems to take the next step beyond traditional algorithm development and seek more opportunities in their research work.

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1 Introduction

With the development of information technologies, human beings are more and more surrounded with floods of information, which further results in problems a person can have in understanding an issue or making decisions that can be caused by the presence of too much information. Recommender systems (RecSys) have proven to be helpful in alleviating this information overload problem, providing personalized services and assisting users' decision making. The basic idea behind RecSys is to infer users' tastes from their past behaviors (such as user ratings, purchases, reviews, click-throughs, etc). RecSys have been widely applied in a number of areas, including eCommerce (e.g., Amazon, eBay), movies (e.g., Netflix, Moviepilot), music (e.g., Pandora, Spotify), news (e.g., Yahoo news), tags (e.g., Flickr), social media (e.g., Twitter), online education (e.g., Coursera), and so forth.

The development of RecSys promotes various research topics, such as user interaction and interfaces, algorithm design avnd evaluation, computational efficiency, and recommendation explanations. As one of applied sciences, the field of recommender systems attracts experts and receives contributions from multidisciplinary areas, including Artificial Intelligence, Human Computer Interaction, Data Science, Decision Support Systems, Marketing, etc.

The track on recommender systems[1] held in conjunction with the ACM Symposium on Applied Computing (ACM SAC) provides a dedicated forum to researchers in RecSys and other applied computing areas for discussing the open research problems, solid solutions, latest challenges, novel applications, and innovative research approaches in RecSys. It has been organized annually by the guest editors of this special issue since 2017. In this special issue, we invited authors to submit the revised and extended version of their accepted papers in the track on recommender systems associated with ACM SAC 2020[2] and 2021.[3] Each submission was reviewed by at least two experts and revised according to the reviewers' comments to ensure the quality of the paper.

2 Summary of the special issue

The accepted papers in this special issue cover a series of promising topics – not only the topic in algorithmic design and evaluations, but also emerging topics, such as alleviating biases in RecSys or protecting private data by federated learning in the system design.

In the paper entitled "*Sequential group recommendations based on satisfaction and disagreement scores*" by Maria Stratigi, Evaggelia Pitoura, Jyrki Nummenmaa, Kostas Stefanidis, the authors introduced the notion of sequential group recommendations, discussed its research problems and challenges, proposed and evaluated new aggregation methods for group recommendations based on the MovieLens and GoodReads datasets. They made the first attempt, to our knowledge, to provide effective solutions to sequential group recommendations, and hopefully more other researchers will devote their efforts along this novel research direction.

There are two papers related to the popular matrix factorization (MF) technique in this special issue. Edoardo D'Amico, Giovanni Gabbolini, Cesare Bernardis and Paolo Cremonesi paid attention to the stability of MF, and proposed a generalization of MF called

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[1]https://recsystrack.wordpress.com/

[2]https://www.sigapp.org/sac/sac2020/

[3]https://www.sigapp.org/sac/sac2021/

Nearest Neighbors Matrix Factorization that can improve the stability of MF, as well as the performance on accuracy, in the paper entitled "*Analyzing and improving stability of matrix factorization for recommender systems*". By contrast, Vito Walter Anelli, Yashar Deldjoo, Tommaso Di Noia, Antonio Ferrara and Fedelucio Narducci focused on the protection of sensitive data by federated learning in their paper "*User-controlled federated matrix factorization for recommender systems*". The proposed federated pair-wise learning is a novel federated learning framework that can exploit pair-wise ranking for the factorization models in recommender systems, and tune the amount of information shared among difference devices. The authors plan to further investigate the behavior of their proposed model in more privacy settings as future work.

Addressing biases in recommender systems became one of the novel and popular research topics recently. Diego Carraro and Derek Bridge proposed a novel sampling approach to debias the offline evaluations in recommender systems, such that researchers can deliver more reliable offline results. The authors plan to extend their methodologies and research to online experiments, as one of their future work in the paper entitled "*A sampling approach to Debiasing the offline evaluation of recommender systems*".

Andrea Iovine, Pasquale Lops, Fedelucio Narducci, Marco de Gemmis, and Giovanni Semeraro delivered an experimental comparison in the paper entitled "*An empirical evaluation of active learning strategies for profile elicitation in a conversational recommender system*". They investigated the application of active learning strategies in the context of conversational recommender systems (CoRS), and compared five state-of-the-art techniques through a user study with 219 participants. The effects on both recommendation quality and interaction cost were measured in their experiment. They confirmed the positive effect of active learning techniques in CoRS, and the results help them better understand how people interact with CoRS using nature language.

3 Conclusions

We hope this special issue can motivate researchers in the area of recommender systems to take the next step beyond traditional algorithm development and seek more opportunities in their research work. We would like, firstly, thank the authors and reviewers for their hard work. In addition, we appreciate the support and assistance by the JIIS and Springer team, especially Zbyszek Ras, the editor-in-chief of JIIS.

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Special Issue Guest Editors

Declarations