

Editorial

# Editorial for the Special Issue on “Modern Recommender Systems: Approaches, Challenges and Applications”

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Recommender systems are nowadays an indispensable part of most personalized systems implementing information access and content delivery, supporting a great variety of user activities. Recommender systems alleviate the problem of information overload, identifying and promoting content that is deemed more suitable for each individual user. To this end, recommender systems collect and process information about user preferences, likings and previous actions; the user’s current context (e.g., the user’s location or company, the time of day or week); the user’s neighborhood and activity in social networks (friends, posts, message exchanges); the characteristics of items to be recommended, including semantic information; and so on. Both static and dynamic views of the collected data are considered, and the algorithms employed to process the available data range from collaborative filtering and statistical models to knowledge-based approaches and matrix factorization.

This Special Issue on “Modern Recommender Systems: Approaches, Challenges and Applications” aims to promote new theoretical models, approaches, algorithms and applications related to the area of recommender systems. The papers in this special issue address a broad spectrum of issues regarding recommender systems: novel algorithms to improve recommender system performance in terms of prediction accuracy, utility and efficiency are introduced, an application of recommender systems to a specific area is presented, and a framework for recommender system evaluation is detailed. Finally, a comprehensive review on the use of opinion mining in recommender systems is included.

In the paper entitled “Improving Collaborative Filtering-Based Image Recommendation through Use of Eye Gaze Tracking” [1] the author surveys the extent to which information concerning user visual attention can aid in producing a more precise recommender systems for products associated with images. This work utilizes ratings entered by the user, which denote his/her preferences, and combines them visual attention data. The evaluation shows that combination of these information results into more successful recommendations.

In the paper entitled “Combined Recommendation Algorithm Based on Improved Similarity and Forgetting Curve” [2], the authors firstly propose an improvement to the Pearson similarity metric by considering a wide range of weighted factors, aiming to improve the quality of Pearson similarity in the context of highly sparse data. Subsequently, the users’ shift of interest is tracked using the Ebbinghaus forgetting curve, and user scores are weighted according to the residual memory of forgetting function. By tracking the interest shifts, the proposed algorithm provides increased recommendation accuracy and leverages users’ satisfaction.

In the paper “Optimizing Parallel Collaborative Filtering Approaches for Improving Recommendation Systems Performance” [3], the authors study the problem of CF algorithms’ parallelization under the prism of graph sparsity, and propose solutions for improving the prediction performance of parallel implementations while simultaneously minimizing impact on the recommender

system's time efficiency. The proposed method has been evaluated on top of the Apache Spark system, and results appear to be promising.

In the paper entitled "Using an Exponential Random Graph Model to Recommend Academic Collaborators" [4], the authors propose a weighting method that can be used to combine social context factors in a recommendation engine that leverages an exponential random graph model based on historical network data. The authors demonstrate the effectiveness of their approach using real-world data from collaborations between academic faculty members, showing that weighting social context factors can assist in increasing recommendation accuracy for new users.

In the paper "Mobile Phone Recommender System Using Information Retrieval Technology by Integrating Fuzzy OWA and Gray Relational Analysis" [5], the authors integrate the weights of fuzzy ordered weighted averaging (OWA) and gray relational analysis into the recommendation generation algorithm, managing to create more effective recommendations in the domain of mobile phone e-commerce.

In the paper entitled "Sequeval: An Offline Evaluation Framework for Sequence-Based Recommender Systems" [6], the authors report on a prototype implementation of an offline evaluation framework called "Sequeval" that is designed to evaluate recommender systems capable of suggesting item sequences. The authors include a mathematical definition of sequence-based recommenders, a methodology for performing their evaluation, and the implementation details of eight evaluation metrics. Finally, they report on the lessons learned using the "Sequeval" framework for assessing the performance of four baseline and two recommender systems based on Conditional Random Fields (CRF) and Recurrent Neural Networks (RNN) using two different datasets.

Finally, in the paper "Using Opinion Mining in Context-Aware Recommender Systems: A Systematic Review" [7], the authors recognize the importance of the rich information embedded in the reviews/texts of users in the context of opinion mining and contextual information extraction techniques for recommender systems. To this end, they present a systematic and comprehensive review on recommender systems that explores both contextual information and opinion mining. The results of this review portray the current research on this subject and point out areas needing further research activities.

## References

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