

Engaging Users with Situational Recommendations: Challenges and Results

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ABSTRACT

Recommender Systems are popular tools that automatically compute personalised suggestions for items that are predicted to be interesting and useful to a user [24, 17]. For instance, in the music domain recommender systems support information search and discovery tasks by helping the user to find music tracks or artists that the user may not even know, but he will like [7, 15, 14].

Recommender systems accomplish their functionality by explicitly requesting users to enter their preferences and by tracking users' actions and behaviours, which implicitly signal users' preferences. Then, they aggregate these observation data and build predictive models of the users' future interests. Several techniques have been proposed to model user preferences and generate recommendations for them. But, ultimately, most of the implemented systems use content-, collaborative- or social-based approaches, or even more often, hybrid combinations of these three basic approaches [6].

In addition to long-term interests, which are normally acquired and modelled in RSs, other session specific factors do influence the user's response to the suggested items and therefore should be taken into consideration. These factors include: the ephemeral needs of the users [21, 19], their decision biases [8, 25], the context of the search [10, 18] and the context of items' usage [1]. However, appropriately modeling the user's preferences and behaviour in the possible various and diverse situational contexts and reasoning upon them in order to identify useful, convincing, diverse and relevant recommendations is still challenging. Major technical and practical difficulties must yet to be solved.

First of all, one should parsimoniously narrow down the various types and the number of contextual dimensions that the system should model to those that actually influence the user decision making processes [2, 23]. Then, it is important to understand the dynamics of the impact of such contextual dimensions on the user preferences and the decision-making process [8]. This impact is strongly coupled with the full in-

teraction design of the system [5, 16]. Moreover, it is important to implement technical solutions that enable the system to continuously acquire context-dependent user evaluations (e.g., ratings) for the suggested items, during the full life cycle of the system [20, 11, 12, 22]. Finally, one must embed the contextual dimensions and leverage the acquired data in a recommendation computational model [3, 9], while dealing with the typically very limited knowledge of the system for the users, the items and the contextual situations [4, 13].

These topics will be illustrated in the talk, making examples taken from the recommender systems that we have developed in the tourism and music domains.

Categories and Subject Descriptors

H.3.3 [Information Storage and Retrieval]: Information Search and Retrieval—*information filtering*

General Terms

Design, Experimentation, Human Factors

Keywords

Recommender systems, context awareness, decision making

Bio

Francesco Ricci is associate professor of Computer Science at Free University of Bozen-Bolzano, Italy. His current research interests include recommender systems, intelligent interfaces, mobile systems, machine learning, case-based reasoning and the applications of ICT to tourism and eHealth. He has published more than one hundred academic papers on these topics and has been invited to give talks in many international conferences, universities and companies. He is one of the editors of the Handbook of Recommender Systems (Springer 2011), which is a reference text for researchers and practitioners working in this area. He is the editor in chief of the Journal of Information Technology & Tourism and in the editorial board of the Journal of User Modeling and User Adapted Interaction. He is member of the steering committee of the ACM Conference on Recommender Systems. He served on the program committees of several conferences, including, as a program co-chair, the ACM Conference on Recommender Systems (RecSys), the International Conference on Case-Based Reasoning (ICCBR) and the International Conference on Information and Communication Technologies in Tourism (ENTER).

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III'14, Aug 26-29 2014, Regensburg, Germany
ACM 978-1-4503-2976-7/14/08.
<http://dx.doi.org/10.1145/2637002.2637005>.

1. REFERENCES

- [1] G. Adomavicius, B. Mobasher, F. Ricci, and A. Tuzhilin. Context-aware recommender systems. *AI Magazine*, 32(3):67–80, 2011.
- [2] L. Baltrunas, B. Ludwig, S. Peer, and F. Ricci. Context relevance assessment and exploitation in mobile recommender systems. *Personal and Ubiquitous Computing*, 16(5):507–526, 2012.
- [3] L. Baltrunas and F. Ricci. Experimental evaluation of context-dependent collaborative filtering using item splitting. *User Model. User-Adapt. Interact.*, 24(1-2):7–34, 2014.
- [4] M. Braunhofer. Hybrid solution of the cold-start problem in context-aware recommender systems. In V. Dimitrova, T. Kuflik, D. Chin, F. Ricci, P. Dolog, and G.-J. Houben, editors, *UMAP*, volume 8538 of *Lecture Notes in Computer Science*, pages 484–489. Springer, 2014.
- [5] M. Braunhofer, M. Elahi, M. Ge, and F. Ricci. Context dependent preference acquisition with personality-based active learning in mobile recommender systems. In *Learning and Collaboration Technologies. Technology-Rich Environments for Learning and Collaboration - First International Conference, LCT 2014, Held as Part of HCI International 2014, Heraklion, Crete, Greece, June 22-27, 2014, Proceedings, Part II*, pages 105–116, 2014.
- [6] R. Burke. Hybrid web recommender systems. In *The Adaptive Web*, pages 377–408. Springer Berlin / Heidelberg, 2007.
- [7] Ò. Celma and P. Lamere. If you like radiohead, you might like this article. *AI Magazine*, 32(3):57–66, 2011.
- [8] L. Chen, M. de Gemmis, A. Felfernig, P. Lops, F. Ricci, and G. Semeraro. Human decision making and recommender systems. *ACM Transactions on Interactive Intelligent Systems*, 3(3):17, 2013.
- [9] V. Codina, F. Ricci, and L. Ceccaroni. Local context modeling with semantic pre-filtering. In *Seventh ACM Conference on Recommender Systems, RecSys '13, Hong Kong, China, October 12-16, 2013*, pages 363–366, 2013.
- [10] P. Dourish. What we talk about when we talk about context. *Personal and Ubiquitous Computing*, 8(1):19–30, February 2004.
- [11] M. Elahi, M. Braunhofer, F. Ricci, and M. Tkalcić. Personality-based active learning for collaborative filtering recommender systems. In M. Baldoni, C. Baroglio, G. Boella, and R. Micalizio, editors, *AI*IA 2013: Advances in Artificial Intelligence - XIIIth International Conference of the Italian Association for Artificial Intelligence, Turin, Italy, December 4-6, 2013. Proceedings*, volume 8249 of *Lecture Notes in Computer Science*, pages 360–371. Springer, 2013.
- [12] M. Elahi, F. Ricci, and N. Rubens. Active learning strategies for rating elicitation in collaborative filtering: A system-wide perspective. *ACM TIST*, 5(1):13, 2013.
- [13] M. Enrich, M. Braunhofer, and F. Ricci. Cold-start management with cross-domain collaborative filtering and tags. In C. Huemer and P. Lops, editors, *E-Commerce and Web Technologies - 14th International Conference, EC-Web 2013, Prague, Czech Republic, August 27-28, 2013. Proceedings*, volume 152 of *Lecture Notes in Business Information Processing*, pages 101–112. Springer, 2013.
- [14] M. Kaminskas, I. Fernández-Tobías, F. Ricci, and I. Cantador. Knowledge-based identification of music suited for places of interest. *J. of IT & Tourism*, 14(1):73–95, 2014.
- [15] M. Kaminskas and F. Ricci. Contextual music information retrieval and recommendation: State of the art and challenges. *Computer Science Review*, 6(2-3):89–119, 2012.
- [16] B. P. Knijnenburg, N. J. M. Reijmer, and M. C. Willemsen. Each to his own: how different users call for different interaction methods in recommender systems. In *Proceedings of the 2011 ACM Conference on Recommender Systems, RecSys 2011, Chicago, IL, USA, October 23-27, 2011*, pages 141–148, 2011.
- [17] J. A. Konstan and J. Riedl. Recommender systems: from algorithms to user experience. *User Model. User-Adapt. Interact.*, 22(1-2):101–123, 2012.
- [18] T. Mahmood, F. Ricci, and A. Venturini. Improving recommendation effectiveness by adapting the dialogue strategy in online travel planning. *International Journal of Information Technology and Tourism*, 11(4):285–302, 2009.
- [19] L. McGinty and J. Reilly. On the evolution of critiquing recommenders. In F. Ricci, L. Rokach, and B. Shapira, editors, *Recommender Systems Handbook*, pages 419–453. Springer Verlag, 2011.
- [20] O. Moling, L. Baltrunas, and F. Ricci. Optimal radio channel recommendations with explicit and implicit feedback. In P. Cunningham, N. J. Hurley, I. Guy, and S. S. Anand, editors, *RecSys*, pages 75–82. ACM, 2012.
- [21] Q. N. Nguyen and F. Ricci. Long-term and session-specific user preferences in a mobile recommender system. In *International Conference on Intelligent User Interfaces*, pages 381–384, New York, NY, USA, January 13-16, 2008. ACM.
- [22] T. T. Nguyen, D. Kluver, T.-Y. Wang, P.-M. Hui, M. D. Ekstrand, M. C. Willemsen, and J. Riedl. Rating support interfaces to improve user experience and recommender accuracy. In *Seventh ACM Conference on Recommender Systems, RecSys '13, Hong Kong, China, October 12-16, 2013*, pages 149–156, 2013.
- [23] A. Odic, M. Tkalcić, J. F. Tasic, and A. Kosir. Predicting and detecting the relevant contextual information in a movie-recommender system. *Interacting with Computers*, 25(1):74–90, 2013.
- [24] F. Ricci, L. Rokach, and B. Shapira. Introduction to recommender systems handbook. In F. Ricci, L. Rokach, B. Shapira, and P. B. Kantor, editors, *Recommender Systems Handbook*, pages 1–35. Springer US, 2011.
- [25] E. C. Teppan and A. Felfernig. Minimization of decoy effects in recommender result sets. *Web Intelligence and Agent Systems*, 10(4):385–395, 2012.