



Title	Mining Product Experiences from User Generated Reviews: A Recommender Systems Perspective
Authors(s)	Muhammad, Khalil, Lawlor, Aonghus, Rafter, Rachael, Smyth, Barry
Publication date	2014-09
Publication information	Muhammad, Khalil, Aonghus Lawlor, Rachael Rafter, and Barry Smyth. "Mining Product Experiences from User Generated Reviews: A Recommender Systems Perspective," 2014.
Conference details	22nd International Conference on Case-Based Reasoning, Cork, Ireland, 29 September - 01 October 2014
Item record/more information	http://hdl.handle.net/10197/6456

Downloaded 2024-09-12 18:12:32

The UCD community has made this article openly available. Please share how this access benefits you. Your story matters! (@ucd_oa)



© Some rights reserved. For more information

Mining Product Experiences from User Generated Reviews: A Recommender Systems Perspective

Khalil Muhammad, Aonghus Lawlor, Rachael Rafter, and Barry Smyth

Insight Centre for Data Analytics
University College Dublin,
Belfield, Dublin 4, Ireland.
{firstname.lastname}@insight-centre.org

1 Introduction

Recommender systems play an established role in helping users find the right information and products at the right time. They provide an alternative to query-based search, harnessing learned user profiles to identify relevant and interesting items for recommendation.

In contrast to collaborative filtering, case-based recommendation is a form of content-based recommendation that relies on more structured item representations while borrowing notions of similarity from traditional CBR research. It is well-suited to many product recommendation domains where individual products are described in terms of a well-defined set of features (e.g. price, color, make, etc.). This approach to recommendation has proven to be very successful in many e-commerce settings especially when the needs and preferences of users are ill defined, as they often are [1]. One drawback of this approach is that it is often hard to extract and adequately map information from an item onto a perceptually meaningful descriptor. This presents a need for effective feature extraction, selection and comparison strategies toward building a rich case-base.

A common challenge of recommender systems is user acceptability and trust. Recommenders normally operate as *blackboxes* providing no transparency into their reasoning process. Explanations provide that transparency by presenting additional information that help users better understand the output of the recommender system [2]. Studies [3] [4] [5] have shown that the effectiveness of a recommender system is influenced by how the system presents and explains recommendations to the user.

The starting point for this work is the idea that we can mine novel product descriptions from user-generated reviews as proposed in [6], [7] and [8]. Related work [?] has looked at how to extract useful info from user generated content such as reviews and [9] shows how these techniques can be usefully adapted to produce the type of item descriptions that can drive a case-based recommender. A lot of work has been done on explanations in recommender systems. Tintarev et al. [10] define the possible goals of explanation facilities in recommender systems and show that the presentation of recommendations influences the effectiveness of explanations. Friedrich et al. [2] propose a taxonomy for categorizing

explanations based on major design principles: reasoning model, recommendation paradigm and the exploited information categories. To our knowledge, there is still no consensus on what constitutes a good explanation, hence the need for further research.

2 Research Plan

The core focus of this work is to continue to explore the potential of user-generated reviews as a source of recommendation knowledge. Our goal is to define a case-based strategy for recommendation and explanation based solely on user opinions. In particular we have identified the following areas of interest:

Harnessing Opinionated Product Descriptions in Recommendation In this work we continue directly from the work of [9], exploring more deeply some of the issues associated with generating opinionated product descriptions. Key questions include the development of techniques for evaluating the quality of automatically mined features; identifying different classes of features that may highlight item-specific or user-specific aspects; using these descriptions in different types of recommendation tasks including more-like-this style recommenders and query/profile-based recommendation.

Explanation-Driven Recommendation How does the availability of opinion information influence the manner in which recommendations can be explained and/or justified to users? Can we use opinion features and associated sentiment to create novel and compelling explanation structures? Do such structures have a role to play during recommendation itself as well as post-recommendation as part of the presentation to the user?

Summarizing Product Reviews Products often have thousands of reviews written by different users with different preferences and needs. How can these reviews be summarized to help new users better understand the opinions of others? Amazon and others have started to look at one-size-fits-all type of review summaries by highlighting one or two most helpful reviews or by highlighting particular features that are frequently mentioned in reviews. But what about creating more personalized review summaries that respond to the learned preferences of users?

2.1 Methodology

First, we employ statistical methods and lexical analysis to identify and define the concept of a *useful feature*. Secondly, we investigate strategies for selecting features for generating a case-base. Thirdly, we design a case-based recommender and various explanation interfaces. Our goal is to ascertain *effective* explanation styles through experimentation. Finally, we aim to develop an approach for reusing explanations to refine the recommendation process.

3 Progress

We have employed algorithms described in [9] to mine opinions from TripAdvisor¹ hotel reviews; we have experimented with different parameters to learn which provided more meaningful extractions. Secondly, we have considered opinion summarization and search similar to [11]. We have implemented a retrieval strategy that accepts natural language queries based on opinions from reviews. Additionally, we have proposed various methods of summarizing opinions based on statistical metrics. Currently, we are experimenting with feature quality metrics. Our aim is to establish a relevance score that describes the *usefulness* of extracted opinions. We are also running recommendation experiments using different versions the extracted opinions.

References

1. Smyth, B.: Case-based recommendation. In: The Adaptive Web. Volume 4321 of Lecture Notes in Computer Science. Springer Berlin Heidelberg (2007) 342–376
2. Friedrich, G., Zanker, M.: A taxonomy for generating explanations in recommender systems. *AI Magazine* **32** (2011) 90–98
3. Pu, P., Chen, L., Hu, R.: Evaluating recommender systems from the users perspective: survey of the state of the art. *User Modeling and User-Adapted Interaction* **22** (2012) 317–355
4. Knijnenburg, B.P., Schmidt-Thieme, L., Bollen, D.G.: Workshop on user-centric evaluation of recommender systems and their interfaces. In: Proceedings of the fourth ACM conference on Recommender systems, ACM (2010) 383–384
5. Konstan, J.A., Riedl, J.: Recommender systems: from algorithms to user experience. *User Modeling and User-Adapted Interaction* **22** (2012) 101–123
6. Hu, M., Liu, B.: Mining opinion features in customer reviews. In: Proceedings of the 19th National Conference on Artificial Intelligence. AAAI’04, AAAI Press (2004) 755–760
7. Moghaddam, S., Ester, M.: Opinion digger: An unsupervised opinion miner from unstructured product reviews. In: Proceedings of the 19th ACM International Conference on Information and Knowledge Management. CIKM ’10, New York, NY, USA, ACM (2010) 1825–1828
8. Dong, R., Schaal, M., O’Mahony, M.P., McCarthy, K., Smyth, B.: Harnessing the experience web to support user-generated product reviews. In: Case-Based Reasoning Research and Development. Volume 7466 of Lecture Notes in Computer Science. Springer Berlin Heidelberg (2012) 62–76
9. Dong, R., Schaal, M., O’Mahony, M.P., McCarthy, K., Smyth, B.: Opinionated product recommendation. In: Case-Based Reasoning Research and Development. Volume 7969 of Lecture Notes in Computer Science. Springer Berlin Heidelberg (2013) 44–58
10. Tintarev, N., Masthoff, J.: Designing and evaluating explanations for recommender systems. In: Recommender Systems Handbook. Springer US (2011) 479–510
11. Huang, J., Etzioni, O., Zettlemoyer, L., Clark, K., Lee, C.: Revminer: An extractive interface for navigating reviews on a smartphone. In: Proceedings of the 25th Annual ACM Symposium on User Interface Software and Technology. UIST ’12, New York, NY, USA, ACM (2012) 3–12

¹ <http://www.tripadvisor.ie/Hotels>