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<td><strong>Authors(s)</strong></td>
<td>Dong, Ruihai; Schaal, Markus; O'Mahony, Michael P.; McCarthy, Kevin; Smyth, Barry</td>
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ABSTRACT
User generated reviews are now a familiar and valuable part of most e-commerce sites since high quality reviews are known to influence purchasing decisions. In this demonstration we describe work on the Reviewer’s Assistant (RA), which is a recommendation system that is designed to help users to write better quality reviews. It does this by suggesting relevant topics that they may wish to discuss based on the product they are reviewing and the content of their review so far.

Categories and Subject Descriptors
H.3.3 [Information Storage and Retrieval]: Information Search and Retrieval

Keywords
product reviews, computer support, topic recommendation, recommendation systems

1. INTRODUCTION
It is increasingly important for sites like Amazon and TripAdvisor to help people find and create high-quality reviews since people are increasingly turning to user-generated reviews to support their decision-making. Amazon provides users with the opportunity to rate reviews based on their helpfulness and allows prospective customers to rank reviews by their helpfulness score.

In this demo we instead focus on the task of creating new reviews and specifically how recommendation techniques may support users as they write product reviews. This work is inspired by GhostWriter [1], which uses case-based reasoning techniques to make suggestions for the user at review-writing time. Briefly, GhostWriter maintains a case base of review experiences, made up of previously helpful reviews and indexed by the terms that occur in these reviews. As the user writes a new review, the text that they write serves as a query against this case base, GhostWriter retrieves a ranked set of similar review cases, and extracts a set of frequent noun phrases to recommend to the user. Dong et al. [2] adopt a similar approach but compare nouns vs. noun phrases in order to make better suggestions to the user.

In the following sections we describe our approach to review recommendation and how this has been incorporated into a browser plugin and illustrate how it works.

2. THE REVIEWER’S ASSISTANT
The Reviewer’s Assistant has been developed as a browser plugin so that it can integrate directly with review systems across a wide variety of web sites, see [2]. Briefly, the Reviewer’s Assistant takes the form of an additional recommendation module that appears on review-creation pages. These recommendations are suggested review topics that have been automatically extracted from a database of reviews (on Digital Cameras in this instance) and selected and ranked according to the content of the user’s review so far. At any time the user can even select a topic to see an expanded list of relevant review fragments which is a good aid for the review process.

The basic Reviewer’s Assistant system architecture has been described in detail elsewhere (see [2]). For the purpose of this demonstration it is sufficient to outline its four main components. The filtering module is responsible for extracting and indexing a suitable set of high quality reviews for a given product class. This can be as straightforward as using review quality indicators as a guide (e.g. on Amazon). When a user begins writing a new review, their early content is used as a query against these filtered reviews and the mapping component is responsible for identifying a set of k similar reviews (k = 50); currently, we use a simple Jaccard similarity metric. Next, from this set of relevant reviews the extraction component extract nouns, noun phrases, and ultimately topics from these reviews. The crucial step of identifying and ranking frequent sets of nouns is performed by association rule mining (see [2]).

In order to generate a rich set of suggestions we apply association rule mining both at the review level and at the sentence level to extract a set of association rules as the basis for recommendation. Briefly, our system takes, as input, the set of similar reviews and the current review text by the user and outputs a set of n (n = 10) suggestions. If association rules do not lead to a set of n recommended topics then further topics are extracted from reviews based on a simple frequency count as a fallback strategy. Thus as the user continues to type their review, extracted rules can be triggered leading to updated recommendations. Equally,
as topics are covered by users in their writing, corresponding recommendations fall away.

In this demonstration we show a novel variation of the Reviewer’s Assistant with an extended core recommendation strategy. Instead of noun suggestions that are drawn directly from past reviews we are now presenting topic-based suggestions to the user. The benefit of this is two-fold: 1) product topics can be more intuitive for new reviewers than nouns; and 2) by recognizing common topics across suggestions we can improve recommendation ranking and diversity and reduce redundancy. At this moment, we adopt a very simple approach to topic modeling based around a hand-coded set of topics for the target domain, with each topic associated with a synonym set.

3. THE RA IN ACTION

Figure 1 shows the Reviewer’s Assistant in action for our user, Joe, who is reviewing a recently purchased Nikon D90 SLR camera on Amazon. Joe is presented with the usual Amazon review creation screen and the figure shows the Reviewer’s Assistant overlay: the RA widget can be dragged to any suitable location on screen. The RA presents a dynamic set of updating review suggestions. Figure 1 (left) shows some of the suggestions presented to Joe during the early stages of the review. In this case we see a number of suggestions for some common review topics for this product, including the lens, the image and video capability. As shown, Joe can view review fragments that relate to a particular topic by hovering the mouse over the topic. For example, in this case the fragments “the kit lens”, “the 18-200mm lens” etc. are displayed for topic “lens”. Joe can now directly select suggestions, e.g. “the kit lens”, and the selected suggestion will be inserted at the end of his current writing.

In Figure 1 (right) we see a snapshot towards the end of the review writing. This time Joe is presented with additional topics, many of which are more specialised or not uniquely related to the specific product to provide the reviewer with an opportunity to broaden their review. Note also that recommended topics that are already covered by Joe in this snapshot are highlighted by emphasising the respective topic terms in the sentences of the current writing, including lens, aperture, shutter, battery life, etc.

4. CONCLUSIONS

We have evidence that the Reviewer’s Assistant supports the writing of better quality and more comprehensive reviews. This is of significant importance for e-commerce sites such as Amazon, TripAdvisor, etc. User trial participants generally provide positive feedback about the quality of suggestions and their overall experience.

5. REFERENCES