Helping E-Commerce Consumers Make Good Purchase Decisions: A User Reviews-Based Approach

Richong Zhang and Thomas Tran

School of Information Technology and Engineering
University of Ottawa
Ottawa, Ontario, Canada
{rzhan025, ttran}@site.uottawa.ca

Abstract. Online product reviews provided by the consumers, who have previously purchased and used some particular products, form a rich source of information for other consumers who would like to study about these products in order to make their purchase decisions. Realizing this great need of consumers, several e-commerce web sites such as Amazon.com offer facilities for consumers to review products and exchange their purchase opinions. Unfortunately, reading through the massive amounts of product reviews available online from many e-communities, forums and newsgroups is not only a tedious task but also an impossible one. Indeed, nowadays consumers need an effective and reliable method to search through those huge sources of information and sort out the most appropriate and helpful product reviews. This paper proposes a model to discover the helpfulness of online product reviews. Product reviews can be analyzed and ranked by our scoring system and those reviews that may help consumers better than others will be found. In addition, we compare our model with a number of machine learning techniques. Our experimental results confirm that our approach is effective in ranking and classifying online product reviews.

Keywords: E-Commerce, Online Product Review, Review Helpfulness, Information Gain, Scoring System.

1 Introduction

Online product review aggregation web sites such as Epinion.com provide consumers with platforms to express and exchange their opinions about products, services and merchants. Consumers who have previously used some specific products or services write reviews of these products and services and rate them by specifying a number of stars. Consumer reviews have become a rich source of information based on which other consumers make purchase decisions. As a matter of fact, online product reviews are showing up as a “new genre” [7], and according to [3] “Online product reviews provided by consumers who previously purchased products have become a major information source for consumers and marketers regarding product quality”.

As consumers try to make good use of online product reviews, several challenging difficulties arise. First of all, with a star rating scheme, consumers can not get the real semantics of reviews. Also, by nature reviews are unstructured and often mix between

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reviewers’ feelings and opinions. Although search engines are good tools to assist in looking for information, they are not useful in identifying helpful product reviews, since the result set of a query returned by a search engine is often huge and unmanageable. For example, if we input “xbox 360 reviews” in Google, we will receive 47,100,000 web pages, which is clearly impossible for any human to read through. In addition, in a typical online community like Epinion.com, there are usually more than 1000 reviews submitted by different consumers for a specific product. Some review aggregation web sites allow consumers to vote whether or not a review is helpful after they read the review. However, this process takes time far before a really helpful review is discovered. Moreover, the fact that the latest posted reviews are always the least voted ones makes this mechanism inevitably unfair and incomplete. Indeed, consumers need an effective way to classify and rank online product reviews based on the reviews’ helpfulness, in order to make good use of this source of information for their purchase decisions.

Our goal is to develop a method that can filter out the most likely helpful reviews for consumers, hence providing reliable information for consumer’s decision making. In particular, we propose in this paper an entropy-based model that ranks reviews and returns an ordered list of reviews with their helpfulness estimates. We evaluate the performance of our model using the reviews collected from Amazon.com. The experimental results confirm that our approach outperforms or performs the same as other machine learning methods.

The remainder of this paper is organized as follows: Section 2 discusses related work. Section 3 presents our proposed model in detail. Section 4 describes our experimental evaluation of the model, and Section 5 concludes the paper with future research directions.

2 Related Work

Some researches have been working on sentiment classification, also known as polarity classification, on online product reviews, to distinguish or predict whether consumers like some particular product or not based on their reviews of the product. Hatzivasiloglou et al. proposed a method to predict the semantic orientation of adjectives by a supervised learning algorithm [1]. Turney presented an unsupervised learning algorithm to classify reviews as recommended or not recommended by analyzing the semantic orientation based on mutual information [9]. In [13], the authors proposed a classification approach to separate sentences as positive or negative. In [5], the authors classified movie reviews as positive or negative using several machine learning methods, namely Naive Bayes, Maximum Entropy, and Support Vector Machines (SVM). They also made use of different features such as unigram, bigram, position, and the combination of these features. Their results showed that the unigram presence feature was the most effective and that SVM method performed the best for sentiment classification.

The effect of online product reviews on product sales is also a study area. In [6], the authors discovered that the quality of reviews has positive effect on product sales and that consumers purchase intentions increases with the quantity of product reviews. Hu et al. [3] mentioned that consumers not only considered the review’s ratings but also the contextual information like reviewer’s reputation. They also found that the impact of online reviews on sales diminishes over time.