
전자 상거래 사이트의 가짜 리뷰 판별 기법 조사

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Survey on Fake Review Detection of E-commerce Sites

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요 약

전자 상거래 리뷰 정보에 대한 소비자들의 의존도가 증가하고 있다. 제품 리뷰는 잠재적인 고객의 구매 결정에 있어 중요한 결정 요소이다. 제품 리뷰는 또한 상품 제조사들이 자신들의 제품에 대한 문제점을 발견하고 자신들의 경쟁자들에 대한 경쟁 정보를 수집할 수 있도록 해준다. 불행히도 많은 온라인 제품 정보들이 그 제품에 대한 진짜 고객들에 의해 만들어지지 않은 것이라는 것은 잘 알려진 사실이다. 리뷰를 쓰는 사람들은, 특정 제품의 평판을 떨어뜨리기 위해 가짜로 부정적인 리뷰를 쓰거나, 특정 제품에 대해 부당하게 긍정적인 리뷰를 써서 그 제품을 홍보하기도 한다. 이러한 리뷰들을 가짜 리뷰라고 한다. 가짜 리뷰 판별 기법은 가짜 리뷰를 판별하고 삭제하여 진실한 리뷰들만 독자에게 제공하기 위한 기법이다. 현재까지 이 문제에 대한 연구는 많이 발표되지 않았다. 본 논문에서, 우리는 관련 연구들을 조사하고 가짜 리뷰 판별 기법들에 대해 간단히 조망해 보고자 한다. 웹 스팸 및 이메일 스팸과 같은 가짜 리뷰 판별과 관련된 연구들을 소개한다. 그리고, 가짜 리뷰들을 판별하기 위한 방법들을 소개하고 요약한다. 마지막으로 가짜 리뷰 판별에 대한 연구 추세들로 결론을 맺는다.

ABSTRACT

People increasingly rely on sources of information from E-commerce reviews. Product reviews is an important determinant of potential customers' buying choices. They are also utilized by product manufacturers to find problems of their products and to collect competitive intelligence information about their competitors. Unfortunately, it is well-known that many online product reviews are not made by genuine costumers of products. Reviewers could write some undeserving positive reviews to promote or fake negative reviews to defame some certain product, and we call them fake product reviews. Fake product review detection makes an attempt to detect fake reviews and removes them to restore the truthful ones for readers. To the best of our knowledge, there is still less published study on this problem. In this paper, we make a survey and an attempt to give a brief overview on fake product review detection. The related work of fake product review detection is presented including web spam and spam email. Then some methods to detect fake reviews are introduced and summarized. The trend of fake product review detection is concluded finally.

키워드

Product reviews, fake review, consumer reviews, detection method.

1. Introduction

In most of the E-commerce sites, review section is provided for costumers so that they can write reviews of products at these sites

and express their views. In the past few years, people have a lot of interest in mining opinions existing in reviews due to many popular applications(i.e. Amazon.com). Though these reviews support important information to

us, they have no quality control in some E-commerce sites, so anyone can write fake reviews and mislead potential customers in making their choices and in buying low-quality products, but manufacturers with good reputation can be defamed by malicious reviews. In order to protect customers, manufacturers and the whole e-commerce environment, it is necessary to take required measures to stop fake reviews to show.

A decision to commit fake review rely on competition and reputation incentives rather than simply the organization's ethics[10], so we can't depend on organization's self-discipline. So detecting the fake reviews and removing them from e-commerce sites become more and more important. This paper shows us a brief introduction of existing techniques and algorithms. Some relevant analysis about detecting method is presented. Finally, basing on above work, we proposed some problems of further research.

II. Related Work

Web spam is defined as a lot of techniques to ruin the ranking algorithms of web search engines and cause these rank search results to be higher than they would [1]. Junk email mainly refers to the email of advertising, electronic publications and a variety of forms of propaganda materials such as promotional e-mail. Artificial method can be used to identify web spam and junk email, but a reviewer can deliberately disguise his fake reviews so that these reviews appear to be no difference with normal ones. So it is very hard to detect some fake reviews by even using artificial method, and the existing methods of detecting web spam and junk email [2] can't be not used to detect the fake product reviews. Although detection methods of web spam and junk email have been investigated extensively. We will find that fake review is quite different from web spam and junk email, and requires different detection techniques. We discuss three different kinds of methods for fake product review detection as follows.

III. Fake review detection methods

3.1 Review centric method

Jindal N and others get the training data set by identifying the duplicate and near duplicate

reviews. Then construct the machine learning models to classify the reviews. The reviews are classified as spam reviews and non-spam reviews[7]. Duplicate detection is done using the shingle method, and the review is classified as duplicate review when the similarity score is great than 0.9. They used the logistic regression to build learning model. Using only review contents is very hard to detect fake reviews manually, so the data set is hard to label.

Based on above foundation, fake reviews are classified in three categories, that is, untruthful reviews, reviews on brands only and non-reviews. Considering the review content has limited features, authors collect 24 features of text of review, reviewer, products[2].

3.2 Reviewer centric method

If a user is reviewer who make the fake reviews, his reviews are more likely to be fake reviews. Reviewer centric method is a method based on detecting the reviewer who writes the fake reviews, and it is an behavior-driven method. Detecting fake product reviewer is easier than detecting the content of review because a review only involves a user and a product , that is, have less amount of information.

Jindal N and others explore the possibility of finding the suspicious behaviors of reviewers by identifying unusual review patterns[6]. For example, if a reviewer write all positive reviews on all products of a company but other reviewers are generally negative about them, this reviewer's behavior is clearly suspicious.

In [3-7, 9], authors make some researches on detecting the fake product reviewer. Lim E-P and other authors relied on patterns of review content and ratings to define four different fraud behavior models [3] as follows:

- (a) targeting product
- (b) targeting group
- (c) general rating deviation
- (d) early rating deviation

Authors proposed a scoring method to measure the degree demonstrating fraud behaviors by combining the every fraud scores of the reviewer's different fraud behaviors.

If a review is the only review a reviewer has written, we call it a singleton review, and call the reviewer singleton reviewer. Wu and other authors attempted to detect fake singleton

reviews by identifying singleton reviewers[5]. This is distortion based method. In [11], the fake singleton review detection problem is mapped to a abnormally correlated pattern detection problem. Authors propose a hierarchical algorithm to robustly detect the time windows where such fake review attacks are likely to have happened. This algorithm is based on multi-scale multidimensional time series anomaly detection.

3.3 correlation centric method

In [12], authors proposed a concept of review graph to express the relationships among all reviewers, reviews and products' supporters and proposed an iterative computation model to detect suspicious reviewers' relationships. In the review graph, there are three kinds of nodes, that is, reviewer, review, and store.

IV. Our work

In this paper, we make some survey and present some research on fake product review detection. We make some attempt to show the readers an brief overview on detection methods.

V. Conclusion and Future Research

In this paper, we present a brief overview of existing techniques and algorithms about fake product spam detection. These different techniques are used to detect different fake product reviews. Detecting fake product reviews is booming research direction recently and have large market potential but it also have some problems to solve. Our future work is to propose the ensemble methods and framework of detecting system to improve the performance.

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