

Chapter 52

Building Sentiment Analysis Model and Compute Reputation Scores in E-Commerce Environment Using Machine Learning Techniques

Elshrif Ibrahim Elmurngi

École de Technologie Supérieure, Montreal, Canada

Abdelouahed Gherbi

 <https://orcid.org/0000-0001-9117-5743>

École de Technologie Supérieure, Montreal, Canada

ABSTRACT

Online reputation systems are a novel and active part of e-commerce environments such as eBay, Amazon, etc. These corporations use reputation reporting systems for trust evaluation by measuring the overall feedback ratings given by buyers, which enables them to compute the reputation score of their products. Such evaluation and computation processes are closely related to sentiment analysis and opinion mining. These techniques incorporate new features into traditional tasks, like polarity detection for positive or negative reviews. The “all excellent reputation” problem is common in the e-commerce domain. Another problem is that sellers can write unfair reviews to endorse or reject any targeted product since a higher reputation leads to higher profits. Therefore, the purpose of the present work is to use a statistical technique for excluding unfair ratings and to illustrate its effectiveness through simulations. Also, the authors have calculated reputation scores from users’ feedback based on a sentiment analysis model (SAM). Experimental results demonstrate the effectiveness of the approach.

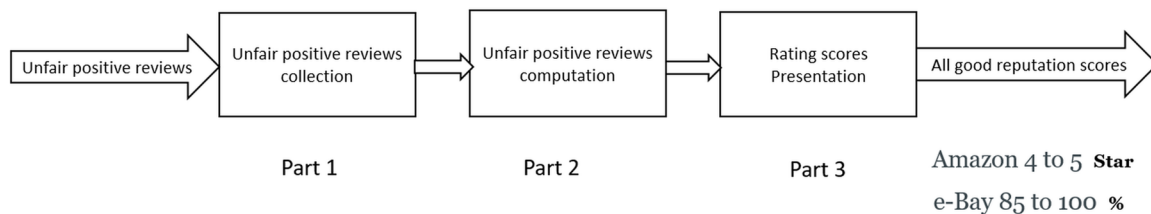
DOI: 10.4018/978-1-6684-6303-1.ch052

1. INTRODUCTION

E-commerce has become one of the major way of shopping for products ranging from simple electronics to valuable items. Almeroth, and Zhao (2010) where collective unfair ratings are referred to as collusion Sun and Liu (2012); Swamynathan et al. (2010) and are more complicated and much difficult to detect than the single unfair ratings Sun and Liu (2012). For that reason, in the present work, we are focusing on understanding and identifying unfair rating scores, all good reputation problems, and collusion and manipulation detection. In online shopping, the customers often depend on other customers' feedback posted through a rating system, before deciding on buying a product (Mukherjee, Liu, & Glance, 2012). Online feedback-based rating systems, also known as online reputation systems, are systems in which users provide ratings to items they bought. Based on the feedback of the product, the consumer decides whether to buy the product or not. This motivates the seller to promote or demote a product of their interest depending on their competitors' product, by posting rating scores which are unfair (Brown and Morgan, 2006; Harmon, 2004). For example, fraudulent sellers may try to increase their income by submitting positive feedback which increases their product rating (Harmon, 2004). In addition, occasional sellers on eBay boost their reputations unfairly by selling or buying feedbacks (Brown and Morgan, 2006). Unfair rating scores are given singularly or collectively Swamynathan,

In the present work, we are focusing on understanding and identifying unfair rating scores, all good reputation problems, and collusion and manipulation detection.

Figure 1. Generic process of “all good reputation” problem



An online rating system needs truthful feedback in order to work properly. An important part of a rating system is creating honest and representative feedback. It should not only have qualitative, quantitative facts opinion-based process, but also should detect situations where some users may try to mislead the system by providing unfair positive and negative reviews, which is likely to lead to collusion and manipulation. Figure 1 Generic process of a reputation system and consists of three main components: feedback collection, computation and rating scores presentation (Noorian and Ulieru, 2010; Sun and Liu, 2012). Feedback Collection is responsible for collecting feedback from community and feeding it to the rating system. A feedback is the opinion of an evaluator on the quality of an item or a person. Generally, a feedback can be expressed either as a number, such as a textual review, or a rating score (Adler, de Alfaro, Kulshreshtha, and Pye, 2011). A numeric feedback can be a negative or positive number chosen from either a discrete list of options, for example, an integer choice between 1 and 5 representing quality of an item. Feedback computation is responsible for computation of all feedbacks received from evalua-

34 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage:

www.igi-global.com/chapter/building-sentiment-analysis-model-and-compute-reputation-scores-in-e-commerce-environment-using-machine-learning-techniques/308530

Related Content

Research on Multi-Parameter Prediction of Rabbit Housing Environment Based on Transformer
Feiqi Liu, Dong Yang, Yuyang Zhang, Chengcai Yang and Jingjing Yang (2024). *International Journal of Data Warehousing and Mining* (pp. 1-19).

www.irma-international.org/article/research-on-multi-parameter-prediction-of-rabbit-housing-environment-based-on-transformer/336286

Frontier Versus Ordinary Regression Models for Data Mining

Marvin D. Troutt, Michael Hu, Murali Shanker and William Acar (2003). *Managing Data Mining Technologies in Organizations: Techniques and Applications* (pp. 21-31).

www.irma-international.org/chapter/frontier-versus-ordinary-regression-models/25758

A Study of XML Models for Data Mining: Representations, Methods, and Issues

Sangeetha Kutty, Richi Nayak and Tien Tran (2012). *XML Data Mining: Models, Methods, and Applications* (pp. 1-28).

www.irma-international.org/chapter/study-xml-models-data-mining/60902

Big Collusion: Corporations, Consumers, and the Digital Surveillance State

Garry Robson and C. M. Olavarria (2016). *Big Data: Concepts, Methodologies, Tools, and Applications* (pp. 1755-1772).

www.irma-international.org/chapter/big-collusion/150241

Spatial Clustering in SOLAP Systems to Enhance Map Visualization

Ricardo Silva, João Moura-Pires and Maribel Yasmina Santos (2012). *International Journal of Data Warehousing and Mining* (pp. 23-43).

www.irma-international.org/article/spatial-clustering-solap-systems-enhance/65572