

Multi-Dimensional Trust Evaluation for E-Commerce Using Feedback Rating and Comments

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Abstract

In e-commerce applications the Reputation-based trust models are widely used, and feedback ratings are aggregated to compute sellers' reputation trust scores. The "all good reputation" problem, however, is predominant in current reputation systems—reputation scores are universally high for sellers and it is difficult for potential buyers to select trustworthy sellers. So another option is to compute the reputation trust scores based on feedback comments as the buyers often express opinions openly in free text feedback comments. CommTrust is a one system used for trust evaluation by mining feedback comments, but there are many buyers who unable to express their opinion freely in text format. In this paper, we propose Multi-Dimensional Trust Evaluation For E-Commerce Using Feedback Rating and Comments. Our main contributions include: 1) we propose a multidimensional trust evaluation model for computing reputation trust scores from user feedback ratings and feedback comments; and 2) we propose an algorithm for mining feedback comments for dimension ratings and weights, combining techniques of natural language processing, opinion mining, and topic modelling.

Index Terms— *Electronic commerce, text mining*

I. Introduction

Reputation-based trust models are important for the success of e-commerce systems. Reputation reporting systems [1] have been implemented in e-commerce systems such as eBay and Amazon (for third-party sellers), where overall reputation scores for sellers are computed by aggregating feedback ratings. For example on eBay, the reputation score for a

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seller is the *positive percentage score*, as the percentage of positive ratings out of the total number of positive ratings and negative ratings in the past year. But there is one problem called as the “all good reputation” problem [1], [2] where feedback ratings are over 99% positive on average [1]. Such strong positive bias cannot exactly guide buyers to select sellers to transact with. One possible reason for the lack of negative ratings at e-commerce web sites is that users who leave negative feedback ratings can attract retaliatory negative ratings and thus damage their own reputation [1].

Although buyers leave positive feedback ratings, they express some disappointment and negativeness in free text feedback comments [3], often towards specific aspects of transactions. For example, a comment like “*The products is good.*” expresses positive opinion towards the *product* aspect, whereas the comment “*Delivery was a slight slow but otherwise, great service. Like it.*” Expresses negative opinion towards the *delivery* aspect but a positive opinion to the *transaction* in general. By examining the information in feedback comments we can uncover buyers’ detailed embedded opinions towards different aspects of transactions, and compute comprehensive reputation trust profiles for sellers.

We propose Multi_Dimensional Trust Evaluation For E_Commerce Using Rating and Feedback Comments. The comprehensive trust profiles for sellers are calculated, including dimension reputation scores and weights, as well as overall trust scores by aggregating dimension reputation scores with feedback rating. Here we consider the different aspects of transactions as dimensions, namely product as described, shipment time, communication, and shipment handling charges.

II. Existing System

- **CommTrust: Comments-Based Multi-Dimensional Trust Evaluation**

A fine-grained multi-dimensional trust evaluation model by mining e-commerce feedback comments is projected in [6]; it is called as Comment-based Multi-dimensional trust (CommTrust).

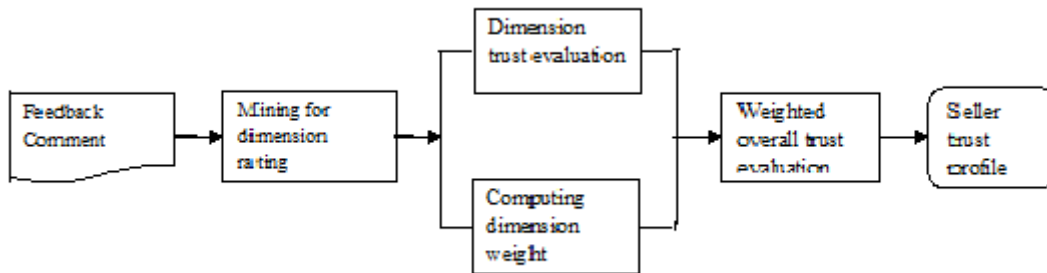


Fig.1.CommTrust Framework

Figure 3.1 depicts the CommTrust framework. Unlike from existing trust evaluation models (including the one used on eBay) where explicit transaction feedback ratings (positive or negative) are used to compute overall trust scores for sellers, the Commtrust only consider the feedback comments. Aspect opinion expressions and their associated ratings (positive or negative) are first extracted from feedback comments then the dimension trust scores together with their weights are calculated by aggregating dimension ratings.

III. Proposed System

CommTrust is a one system used for trust evaluation by mining only feedback comments not the transaction feedback ratings, but there are many buyers who unable to express their opinion freely in text format. So, we have proposed the Multi_Dimensional Trust Evaluation Using Rating and Feedback where unlike the CommTrust system transaction feedback ratings are taken into consideration with feedback comments to compute the Reputation Trust score of the seller.

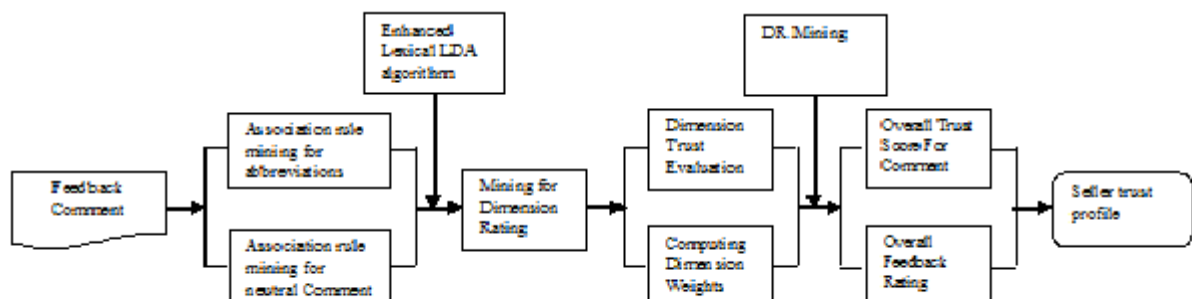


Fig 2: Framework for Multi_Dimensional Trust Evaluation Using Rating and Feedback Comments

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Fig. 2 depicts the framework for Multi_Dimensional Trust Evaluation Using Feedback Rating and Comments. Where the Aspect opinion expressions, and their associated ratings (positive or negative) are first extracted from feedback comments. The Association rule mining for abbreviation and association rule mining for Neutral Comments are applied. Then by using enhanced Latent Dirichlet Allocation (LDA) algorithm Dimension trust scores together with their weights are further computed by clustering aspect expressions into dimensions and aggregating the dimension ratings with feedback rating which forms the Trust Profile of the sellers.

Enhanced Lexical-LDA algorithm is proposed to group aspect expressions into semantically coherent categories, which we call dimensions. Different from the conventional topic modelling approach, which takes the document by term matrix as input; enhanced Lexical-LDA makes use of shallow lexical knowledge of dependency relations for topic modelling to achieve more effective clustering.

IV. Results And Discussions

For extensive experiments, 54,544 feedback comments were crawled for amazon sellers from amazon website for Jewellery portal. The dimension rating scores are generated according to multiple_dimensions.fig.3 and fig.4 shows the generated graph according to two different aspects (dimension) of transaction as per our considered data sets.

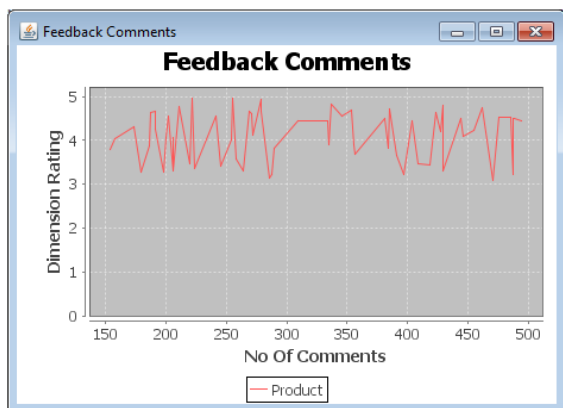


Fig3. Feedback Rating based on Product

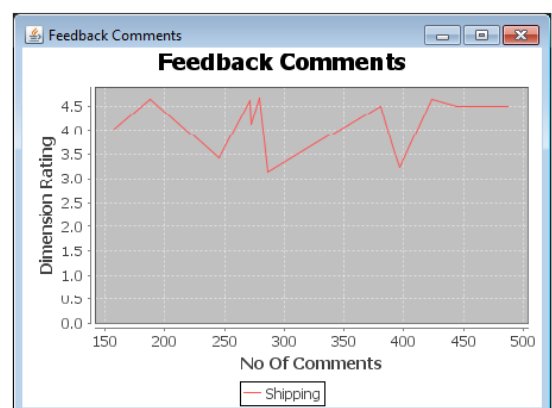


fig.4 Feedback Rating based on Shipping

Shipping

As buyers want to know the best seller form number of seller so in fig.5 the graph according

to rating of seller is generated which helps the potential buyers to select trustworthy seller.

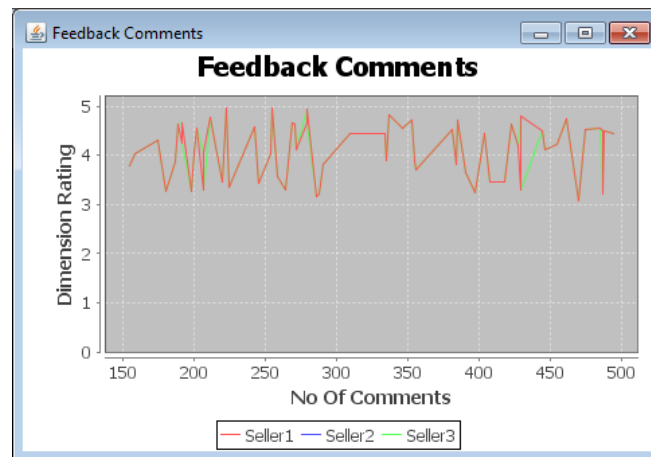


Fig.5: Feedback Rating multiple seller

V. Conclusion

We have proposed a multi-dimensional trust evaluation model for computing comprehensive trust profiles for sellers in e-commerce applications. Different from existing multi-dimensional trust models, we compute dimension trust scores and dimension weights automatically via extracting dimension ratings from feedback comments and aggregating with feedback rating.

Our model can distinctively identify the reputable sellers from another seller that have had bad history with previous buyers. Moreover, the ratings are more reasonable and acceptable, and not all sellers have high scores, as compared to other e-commerce websites. It can significantly reduce the strong positive bias in e-Commerce reputation systems, and solve the “all good sellers” problem. This model is good assistance to the buyers when doing online transaction, as to shield them from being a victim of fraud and untrusted sellers.

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