Identification of Trustworthy Sellers and Buyers in E-commerce

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Abstract - One of the major reasons observed for the fear in minds of thousands of people today to carry out e-commerce transactions for their daily shopping purpose is the lack of trust. In spite of its cost effectiveness, e-commerce lacks the personal relation or contact with the vendor. It is very important to remove this fear from the minds of buyers. The only solution is to build a robust Trust Reputation System (TRS) which will provide helpful information in support of specific trusty sellers and feedback providers thereby contributing in taking the correct decision in any electronic transaction.

As a result, a new architecture for TRS in e-commerce application is proposed in this work which provides a trustful reputation score for each aspect of a targeted product or service, trust degree of the user and ranking to the feedback based on its trustworthiness. In fact, the main part of the architecture lies in an intelligent layer that proposes five point questions from a collection of prefabricated feedbacks summarizing other user's textual feedbacks about the specific aspect of the targeted product obtained using text mining tools and algorithms, to each user who wants to provide his/her recommendation. This ensures that there will be reviews of trusted users only and the product and services will get the perfect ratings according to their aspects and in turn will help customers to build a trust in online transactions.

Index Terms - Trust Reputation System, trust degree, prefabricated feedbacks.

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I. INTRODUCTION

With the rapid growth of data and information available in e-commerce applications, there has been uneasiness in the minds of millions of users about their privacy. Hence, users need to feel secure while purchasing a product or a service for the continuous development of e-commerce. Although cryptography and digital signatures and certificates assist users to make their transaction safer, they remain in adequate to construct a trustful reputation about a product or a service. In fact, they also have to trust the product they want to buy, its quality and the cost of product because trust is a significant factor in any social relationship especially in e-commerce transactions. That's the reason why users rate available products on various web blogs in the e-commerce application and also leave their comments and textual feedbacks in lots of discussion forums.

Trust Reputation System (TRS) is suggested in e-commerce applications so as to create trustworthiness among a group of buyers or participants. This will help them to know the trustworthy products, their aspects and also sellers based on the product's characteristics and their past experiences. The choice of e-commerce users depends highly on user's opinions about the different aspects of product, in order to build their own trust and reputation. Therefore feedbacks, scores, reviews, and the recommendation given by other users are very crucial for the assessment of trust reputation. Hence, the reliability and authenticity of this information needs to be verified before it is visible to the buyers.

The central idea of this system consists of essential mechanisms that aim to recognize mischievous interventions of users whose intention is to deceive or distort the reputation score of a product positively or negatively. In the literature, there are many works that propose algorithms for calculating a reputation or ratings based on the semantic analysis of textual feedbacks in order to a trust score for the product and especially the trust degree of the user.

In contrast to these papers, the attitude adopted by the user is analyzed towards specific prefabricated feedbacks which are stored in knowledge base. The user is going to give his opinion on a scale of 1 to 5 points on those prefabricated feedbacks, whose number varies from 2-10 depending on the choice of user. The degree of trustworthiness for each prefabricated feedback is already calculated. In fact, the text mining algorithm is used to classify users' feedbacks by categories of product and their aspects in a knowledge base depending on their semantic content. The algorithm is also checks whether the user's appreciation about the aspect of a product is in accordance with the review associated to it.

The bottom line is that the proposed TRS algorithm is used to calculate the trust degree of the user based on the trustworthiness of his/her feedback. The trustworthiness evidence depends on user's reaction and choices. Even if the user is very trustworthy, his degree of trust may be incremented by only a low value if the feedback he has evaluated or assessed has low trustworthiness, and the same is done in the reverse condition. Finally, the trust degree of seller is calculated based on various scores of its products. Also the objective of TRS is to give only trustworthy reviews and

produces the global score of the product which will help the user to take decisions in their online transactions. The technique of 5-point questions is a multi-level result technique that helps calculate the trust degree of the user in a very detailed dimension.

The rest of this paper is organized as: In section 2 we have discussed the terminology of trust and reputation systems. Section 3 presents some literature survey done by us. The algorithm and flowchart of our TRS are detailed in section 4. Finally, we come up with our expected results and concluding remarks along with the future work.

II TRUST AND REPUTATION DEFINITIONS

Reputation and trust must be assigned closely to web content in order to estimate usefulness of web content and to use its trustworthiness. We need to create a social interaction, to develop further relations in order to collect more and more information and then filter them and decide about their reliability using TRS [1]. Also, the rating targets at calculating the reputation. A reputation algorithm calculates somehow the reputation of the content from ratings [9].

In our work, we have included the analysis of textual feedbacks for generating the reputation score of the product and its various aspects. However, we need to go through some of the definitions of trust and reputation:

Definition 1:

The definition of Trust is closely related to the willingness to pay, in online markets such as Amazon, the actual selling price without taking an adequate reflection of the "underlying" trust of other buyers in the seller or even the product. [1]

In e-commerce, being trustful is a quality which characterizes a product that a user promises to know from a past experience which is more trustful, or because other users say that it is a reliable product.

Definition 2:

Trust is also considered as a subjective evaluation of the potential outcomes and risks involved by relying on a partner. [1].

Definition 3:

Reputation is generally said or believed to be about a person's or things character or ranking. Related to products and services, it is the subjective opinion based on feelings, past experiences and the viewpoint of a circle of "trustful" people. Reputation is often used in the sense of the community's general reliability and trustworthiness evaluation of a service entity [7].

Therefore, this trust reputation needs to be gathered, collected and filtered in order to generate the most trustful reputation associated to a service, a product or a user. Hence, Trust Reputations Systems are available tools and techniques to gather; collect and filter the feedbacks of trustful people in order to calculate the most reputed service or a product or a user.

Definition 4:

TRS towards the whole community of buyers and sellers is significant classes of decision support tools that can help reduce risk when dealing with in transactions and interactions online. From the community viewpoint, it represents an application of social interaction, moderation and control, as well as a method to assess trust by improving the quality of online markets and communities. [10]

III LITERATURE SURVEY

The authors of many papers like [4] and [7] have proposed their work in several TRS architectures with different algorithms to calculate the reputation score of the online products. The author of paper [6] proposed a novel robust Trust-aware Social Influencer method that considers the evolutionary trust relationship and the variations of historical social influences of participants, which can help deliver more accurate social influences evaluation results in e-commerce.

Hasnae RAHIMI, Hanan EL BAKKALI's [1] paper gives the basic idea of trustworthiness and also explains the use of prefabricated feedback asked to the user. The global reputation score of product is calculated with the help of user appreciation about the product and the trust degree of the feedback given by the user.

Ankita Thakkar, Mrs. Deepali Vora [2] proposed a system which is feeded by the trust score of a product and trust weight of the person to get the decision of whether to buy a product or not that helps the user in decision making.

The system proposed by Gatha kumar, Durai Raj Vincent PM [3] gives the factors which are responsible for gaining trust in online transactions that helps in calculating the trust degree about the contents of the online retailing site.

The system proposed by Yi Yi Thaw, Ahmad Kamil, Mahmood, P.Dhanapal Durai Dominic [5] described the role of security, privacy and risk perceptions of consumers to shop online. Also, the trust of the consumers is negatively associated with perceived risks in online transactions. However, there is no significant impact from perceived security and privacy to trust in e-commerce.

Even in studies attempting to provide more complex and robust reputation methods such as [7] and [8], some issues are still not taken into consideration, such as the update of the trust degree of the user after each feedback, and the agreement between the given rating which is a scalar value and the textual feedback associated to it.

Time is significant in calculating a reputation score because old ratings should get less weight than current ones using a specific method related to the age of the rating in time [8].

In the proposed architecture, for each user who wants to leave a rating (appreciation) and a textual feedback (semantic review), we analyze his attitude toward a number of short and selected feedbacks prefabricated and stored by product in the knowledge base. This user's review is going to be reached by any other user. As a result, we need to know the trust degree of the user and determinate the trust degree of the feedback.

IV PROPOSED SOLUTION

At the beginning, the user gives rating and a textual feedback on a specific product. The TRS need a text mining algorithm which aims to get the given information and verify the concordance between the user's given appreciation and the textual feedback, so as to avoid and eliminate any contradiction.

Once the concordance is verified, system redirects the user to an interface of selected pre-fabricated feedbacks. So as long as feedbacks are added in the data base of origin, a text mining algorithm is going to make pre-fabricated feedbacks with different categories and fill out the knowledge base. The text mining algorithm would contain a part of learning in order to automatically fill out the knowledge base. The user is invited to enter his choice on a scale of five points for each feedback of the displayed selection. Each feedback has already a degree of trustworthiness which represents the trust degree of the user who is the provider of the feedback. Then the proposed reputation algorithm gets the user's opinion on each review in addition to the trustworthiness degree of those feedbacks and uses them to generate a trust degree for the user. Then the global trust score of the product is calculated based on different aspects of the product.

V TRS ALGORIHM

The steps of the TRS algorithm are as follows:

1. User logs in to the system
2. User will mark his/her ratings aspect wise and provide the textual feedback about the product.
3. Verify the concordance between the user appreciation and the textual feedback.
4. If the concordance is verified, display to the user a selection of the most recent pre-fabricated feedbacks about the product user is concerned with; else blacklist the user.
5. This selection of feedbacks is rated by the user on the scale of 1-5 points.
6. Extract data from data base concerning the trustworthiness of the prefabricated feedback and the previous trust degree of the user.
7. Generate (new user) / update (old user) the trust degree of the user using the trustworthiness of the feedback and the user's choice.

8. Normalize the trust degree of the user to match the threshold values [-10, 10].
9. Calculate the score of the provided feedback and store it in knowledge base for further use.
10. Generate the trust score of each aspect of the product using the user's trust degree as a coefficient and his/her ratings as the marks.
11. Calculate the global trust score of the product.
12. Based on the entire product's score belonging to a particular seller, calculate the trust degree of the seller.

VI FLOWCHART
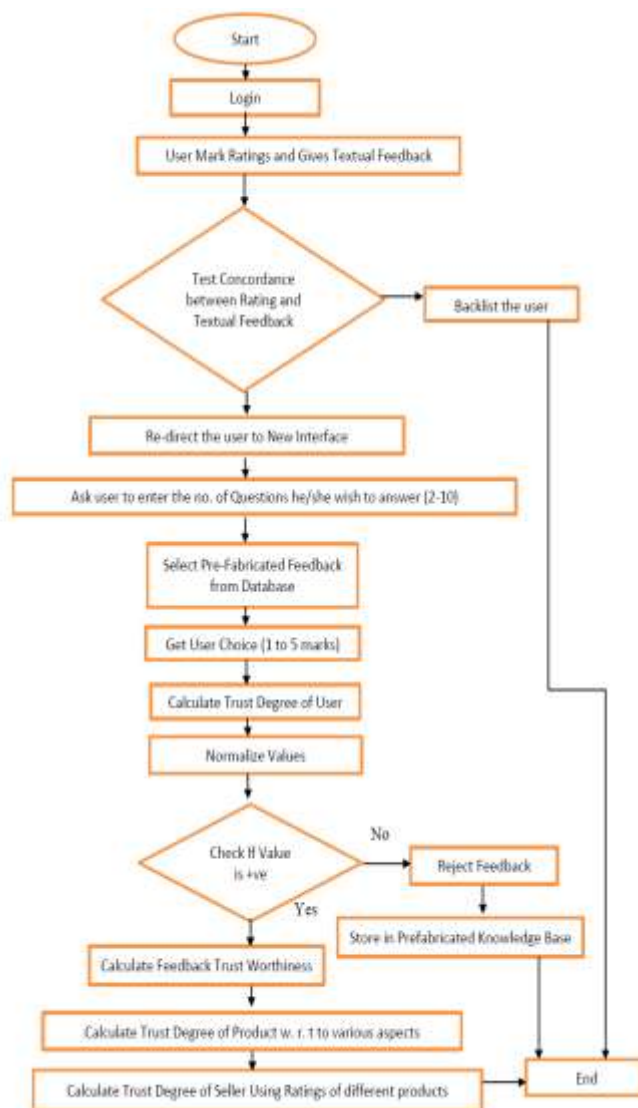
VII EXPECTED RESULTS

As the user gives rating and a textual feedback on a specific product, it is tested for contradiction by TRS. Once the concordance is verified, system redirects the user to an interface of selected pre-fabricated feedbacks. The user is invited to enter his choice on a scale of five points for each feedback of the displayed selection. Then the proposed

reputation system generates the following output, if the user is not blacklisted:

• Trust degree of the users,
• The global trust score for each aspect of the product,
• The global trust score of the product
• Score of the feedback and
• Ratings of the seller

CONCLUSION

In this system, a Trust Reputation System will be designed based on the analysis of the user's attitude towards a collection of prefabricated textual feedbacks of previous users in the knowledge base. A Trust Reputation algorithm is proposed which attempts to calculate the trust degree of the user according to his subjective marking from one to five points and the feedback trustworthiness. The proposed reputation algorithm also calculates the global trust reputation score of the product for its different aspects and generates the trustworthiness of the user's given feedback. Finally, the system generates the rating for the sellers based on its products. As a perspective, this system might increase the accuracy in trustworthiness of users in e-commerce.

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