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New Approach for Computing Trustworthy Reputation in E-commerce Environment

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Abstract— *E-commerce business has been a prevalent and developing industry. In e-commerce, a vender's reputation is a major worry for purchasers before putting in a request and making a payment. Purchasers regularly returned to a site where they have had a recommendatory experience. Along these lines, the goal of this research work is to design an architecture based on an intelligent layer that proposes to each user, i.e., feedback provider who has effectively given his/her suggestion, an accumulation of pre-assembled criticisms outlining other client's literary criticisms to calculate trust degree/score of a client, feedback's dependability, and create worldwide reputation score of a product.*

Keywords— Feedback, Knowledge Discovery, Rating, Text mining, Trust reputation System.

I. INTRODUCTION

Trust is a crucial viewpoint in any transaction whether it is done personally or utilizing accessible present day web facilities. In conventional practice, a purchaser can regularly observe both a dealer and a product. Having checked a product's quality, a purchaser consults with a dealer. It is workable for both the gatherings to evaluate the reliability of one another and for the purchaser to be persuaded about the decency of a product. Be that as it may, in present day online business setting, there are not really any buyer– dealer cooperation and straightforwardness. A purchaser frequently favours understood brands however is hesitant to trust on recently arrived or recently presented locales that offer more advantages. There are various issues related with this perspective specifically from the idea of an item being offered to security game plan by a section in regards to a trade being performed and fragile information being exchanged. Albeit numerous innovations, for example, cryptography, electronic signatures, and certificates, help a purchaser to make exchanges progressively secure, they stay incomplete to develop a supportive and trustful reputation about a product or service. Therefore, clients are not ready to consider a reputation for a product without any additional help.

In such conditions, a feedback evaluation framework can help purchasers to assess the reliability of a product or service being offered to support dependability among a gathering of members as indicated by exchange factors and to their noteworthy way in web transaction. Actually, web based business clients like to concentrate on clients' feelings about a product to consider their own trust and notoriety experience. Consequently, feedbacks, scores, and some other data given by clients are essential and should be honest and trustful on the grounds that numerous other internet business exchanges will be based on them. Ordinal evaluations are enlightened contrastingly by various clients. A portion of the client's evaluating is higher while others rating is lower; along these lines, consequently, remarks can give increasingly dependable data. A measure to speak to precisely the reputation of a dealer is imply to as trust. Trust signifies numerous perspectives to speak to various components of a transaction, for example, comments can provide more reliable information. A system derives trust dimensions from textual feedback comments.

A proposal framework helps clients or end clients in recommending relevant product out of an expansive number of information by breaking down clients' behaviour. For developing a Trust Reputation System (TRS), experienced individuals with fascinating information on focused products/services will be considered. The proposed reputation system framework will help clients to utilize security, dependability score, and criticisms related to any product. In reality, the framework comprises of a basic method that means to identify malicious interventions of clients whose aim is to misrepresent scores related with an item either decidedly or contrarily, to misinform online purchasers, or to defame the reputation of a specific product or service.

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II. RELATED WORK

E-commerce has been developing industry in which purchasers and merchants conduct transactions on the web. Different web based organizations, for example, Amazon.com or web sites, for example, eBay.com have created filthy profitable businesses. In both online business and e-service applications, a dealer's reputation is a major issue for purchasers before putting in a request and making a payment. In the abstract sense, trust is the extent that one party measures that opposite party is willing and able to act in the measuring party's interest [1].

This paper has presented overview of techniques and methods in text mining. Different fundamental methods have been emphasized for conducting text mining. Two terms can have same frequency from statistical analysis this problem can be solved by combined two methods in a single framework. This approach helps to mine efficient pattern and avoid unnecessary time wastage. [2].

A voting based algorithm is utilized for producing privately calculated reputation evaluations from a semantic system. A mathematical and experimental results demonstrate the viability of a calculation to precisely derive the reputation of a node. TrustMail, an application that utilizes the system for rating significant messages [3].

In this work, it has given some hypotheses concerning a text mining algorithm which is supposed to classify users' feedbacks by categories in a knowledge base and verify the concordance between the given appreciation and the feedback associated to it. [4].

A client is given weight for his/her suggestion and after that diverted to another interface so as to give different clients criticisms to help (like/dislike) [5]. This strategy is utilized on the grounds that its aim is to calculate an increasingly trustful score and it comprises in computing a load for each client proposal by utilizing the advanced authentications.

Reputation algorithm used in this TRS is using semantic feedback analysis so as to create a trustful reputation score for product. In reality, there are 3 kinds of feedbacks: positive feedbacks, negative feedbacks, mitigated feedbacks and contradictious feedbacks. As a matter of fact, before sending the client's feedback and suggestion about product to the trust reputation system, it needs to confirm the concordance and the collusion between them so we don't have logical inconsistency [6].

III. PROPOSED SYSTEM ARCHITECTURE

Feedback evaluation system configuration depends on a three-level design and an algorithm that incorporates semantic analysis of feedbacks to create most trustful reputation score for a product. This research work aims to coordinate text mining with e-commerce to enhance selection, storage, generation, and classification of textual feedbacks. The proposed system computes and updates the trust score of a client after any support in trust assessment methods.

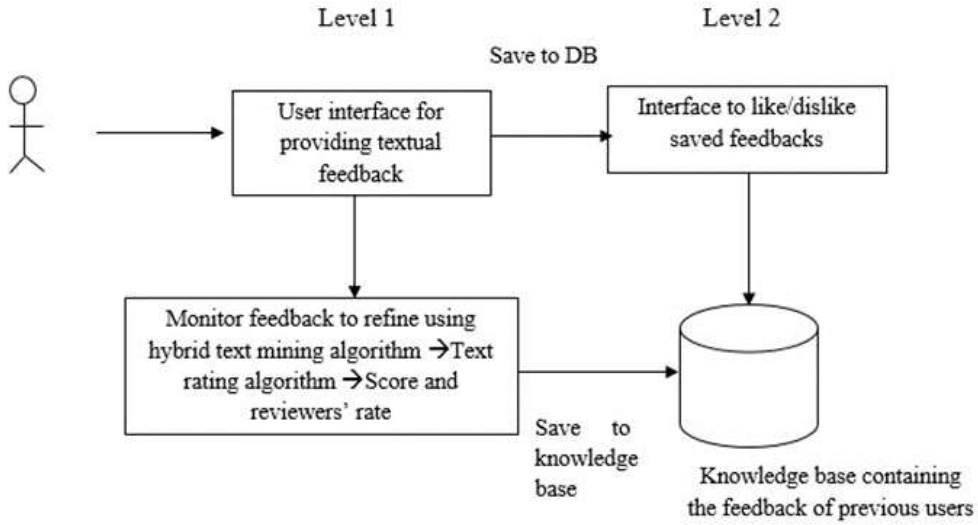

FIG. 1: Architecture of Proposed system

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Figure 1 above shows the architecture of proposed system. The system is an intelligent versatile trust model for measuring and looking at the dependability of feedbacks based on TRS. There are two fundamental dimensions of this model. Initial, a reviewer need to submit his/her feedback to the system. After refining the feedback using hybrid text and rating algorithm, result will be stored in knowledge base. Second, the reviewer is surpassed to another interface in which he/she needs to like/despise the remarks of past clients. At last, after contrasting all feedbacks given by the reviewer, a score will be created and after that stored in the database. A score characterizes how authentic is the feedback submitted by the reviewer.

3.1 Proposed Algorithm

3.1.1 Hybrid text mining algorithm

Using hybrid text mining algorithm, the system monitors feedback provided by a user and refines it. While implementing the algorithm, there are several check-ups that need to be performed. This is the most influential and decisive algorithm in TRS system as textual feedbacks need more refinement because buyers get influenced by textual feedbacks more than any other ratings. The steps for hybrid text mining algorithm are as follows:

1. Scan the provided textual feedback of a product.
2. Check text feedback provided by a user with star ratings.
3. If feedback title and ratings are unbalanced, then display an error message to a user to re-enter ratings and text feedback.

Threshold for checking text with rating is between [0–5], i.e., [0–2] for negative comments and [3–5] for positive comments.

For instance, if a user entered rating 2 for a product but while writing textual feedback for the same product, he/she writes "*Good product*", then an error message is displayed to him/her.

4. If rating > 3, then check word dictionary.

Word dictionary contains hundreds of words to check positive/negative impact of feedback.

3.1.2 Rating algorithm

This algorithm is based on a weighted average or weighted mean, i.e., we have to use weights in terms of stars to compute a decimal value.

Steps involved in rating algorithm are given below:

3.1.3 Star rating approach

1. Sum of (weights × number of reviews at that weight)/total number of reviews

For instance, $(5 \times 18 + 4 \times 18 + 3 \times 13 + 2 \times 1 + 1 \times 13)/63 = 3.428$

2. Compute the decimal value that rounds the calculated sum (i.e., 3.4)

3.1.4 Vote-based approach

1. Check whether current logged in user have already posted the ratings and collect his/her review points (total stars given by him/her for the current product).
2. Check which one of the three inputs a user clicks on (i.e. like, dislike, or undo)
    a. If like/up by user:
        i. Check whether a user liked the comment? If yes, then add to up count and subtract from down in review table.

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ii. Set customer points depending upon positive/negative feedback, i.e., if a logged in user gives stars < 3 and is liking the review which also has stars < 3, then add +1 to a user vote else −1.

b. If dislike/down by user:

i. Check whether a user disliked the comment? If yes, then add to up count and subtract from down in review table.

ii. Set customer points depending upon positive/negative feedback, i.e., if a logged in user gives stars > 3 and is disliking the review which also has stars > 3, then add −1 to a user vote else +1.

c. If undo:

i. Delete user records from database.

ii. Check user previous vote was like/dislike. According to previous positive negative votes subtract or add votes in user points, respectively.

As far we discussed in this paper, compared to leading e-commerce sites in India, we have implemented better refinement of feedbacks. Our system has more elements to find the genuineness of a review than other systems with factors like price and performance. Since reviewers cannot give misleading comments and ratings as system generates an error for such reviews, so they have to maintain equivalence between textual feedback as well as ratings. If a user has already submitted a review, then he/she cannot submit another review, and hence, our system freezes them from adding any additional comments. We implemented a new feature called CAPTCHA to defend TRS from bots. Bots cannot perform harmful activities such as spams. To get a rough idea about a reviewer and his/her usage of a product, we asked questions like how often do you use a product and how long do you have the product? From these questions, we could come to know the intentions of feedback.

IV. CONCLUSION

This research work focused on improving review quality as well as calculating the trust score of a user after any participation in a trust evaluation procedure. Our system has more elements to find the genuineness of a review than other systems with factors like price and performance. The developed system represents a decision mechanism that enables online users to rate each other to give users a clear idea whether to go through a transaction or not. This allows a user to evaluate the reputation of a product, transaction, and online merchant through the experience of other users. In online environments, applying trust and reputation evaluation systems, users can decide whether to trust an online merchant based on probable trust they have on a feedback provider.

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