Reputation based Trust Evaluation in Sentiment Analysis

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Abstract - In e-commerce applications, users prefer to give reviews, feedbacks about the products they have used. Currently most reputation systems directly depend on user's ratings and calculate the score for the product. However the reliability of these scores needs to be verified as some users may have intentions to falsify the product positively or negatively and they can give false feedbacks which can affect the buying decisions of potential users. Therefore there is a need to improve current reputation systems by providing trustworthiness of the users, feedbacks and the products. In this paper, a new architecture has been proposed which detects genuinity of users.The proposed work is the combined approach of sentiment analysis and to calculate reputation score for a product.

These instructions give you the basic guidelines for preparing papers for IEEE conference proceedings.

Index Terms – Trust Reputation System, Sentiment Analysis, Trust Score, Genuinity, Reputation Score

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I. INTRODUCTION

Feedbacks, reviews, scores, recommendations or any other information given by users are very important for online reputation systems. E-commerce users prefer to focus on these opinions about a product to conceive their own trust. The aim of this project is to make these feedbacks more reliable for the potential users.

II. REPUTATION AND TRUST SYSTEM

A system that collects, distributes and aggregates feedback about participant's behaviour. [4]

A reputation system must meet three challenges. These are:
1. Provide information that allows buyers to distinguish between trustworthy and non-trustworthy sellers.
2. Encourage sellers to be trustworthy.
3. Discourage participation from those who aren't.

A. *Reputation systems architecture*
Reputation systems can be designed in a centralized way or in a decentralized way or a mixture of the two [5], [6].
1) Centralized system

In the centralized model there is an appointed trusted authority which is responsible to take care of the operation of

the reputation system. Typically the centralized model requires users to register with the appointed authority. In the centralized model, feedback is provided after a transaction is
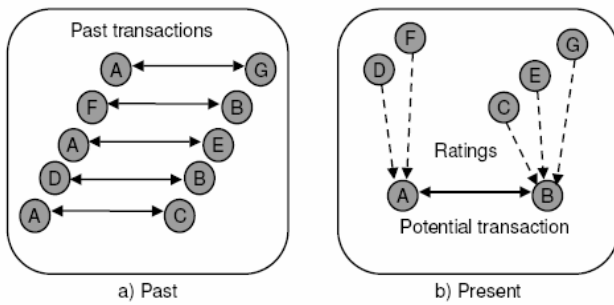
completed and it has to be submitted to the authority. The authority then uses this feedback to compute reputation of the feedback target. Figure 1 illustrates the centralized environment

a) Past   b) Present
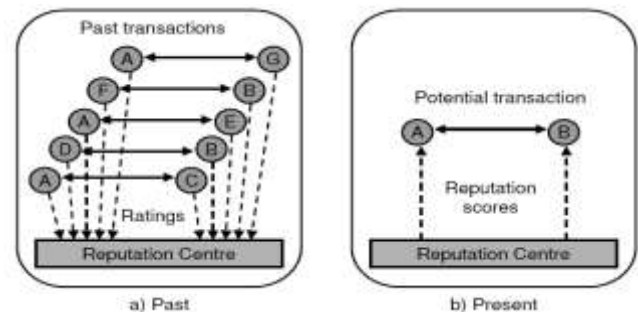
2) Decentralized system
In the decentralized model no authority will be involved in managing the reputation system.
nstead, each player records and calculates its experience with others and keeps it to itself. This information may be provided to others when required and when the user who holds the requested reputation is willing to release. Figure 2.2 illustrates Decentralized system

a) Past   b) Present

B. Participants in Reputation System

1) The feedback provider is an entity who provides a feedback about the feedback target's performance after the transaction between them is completed.

2) The feedback target is an entity who is the owner of the reputation derived from the received feedback.

3) The relying party is an entity who relies on the feedback target's reputation to make a decision whether or not to make a transaction with the feedback target.

4) The collection and calculation authority is an entity that is responsible for collecting the feedback provided by the feedback provider and calculating a reputation for the feedback target.

5) The registration authority is an entity in charge of registration of the users; the feedback provider and the feedback target.

C. Reputation System Model

The reputation system can be divided into three major stages: submission, computation and propagation [6]. Figure 2.3 depicts the stages and their relationship to one another as well as the flow of feedback and reputation.

a.) Submission Stage:
This stage covers the process of submitting feedback and it commonly takes place after a transaction is completed. Since it is the first stage of the reputation system this stage should be sufficiently protected especially from malicious feedback. Hence, identifying

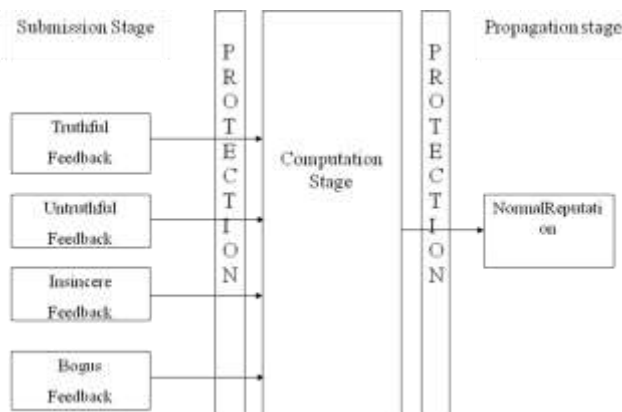the types of submitted feedback flowing into this stage is required.

1. Truthful Feedback: This feedback reflects the true performance of the feedback target during the transaction and it is typically genuine feedback.

2. UntruthfulFeedback: This feedback does not represent the actual performance of the feedback target. However, due to some reason such as expecting some return for the given feedback or fear of retaliation, it is given. The feedback is usually in a positive feedback form and is considered a major threat to the reputation system.

3. InsincereFeedback: This feedback is similar to untruthful feedback except it is usually associated with malicious intentions such as to downgrade a particular feedback target's reputation. This feedback is usually in the negative form.

4. BogusFeedback: This feedback has a similar form to insincere feedback but it is based on an illegitimate transaction.

b) Computational Stage
This stage covers the calculation of the submitted feedback to produce a reputation rating of the feedback target.

c) Propagation Stage
This stage discusses the process of propagating reputation to users. Like the computation stage, propagation can be conducted in two ways: centralized and decentralized. In the centralized model reputation is propagated via a centralized server while in the decentralized model reputation is propagated by entities that hold the requested reputation.

III. PROBLEM STATEMENT

E-commerce system is one of the most widely employed web application in the world nowadays. However, when a trade involves two people without background information, the issue of sellers' reliability is a main concern. E-commerce arena is facing direct trust problem. Existing reputation systems were conceived with the assumption that users will share feedback honestly. But, such systems generally compromise of malicious users. This leads to the problem in cooperation, aggregation and evaluation. So some mechanism is required to detect malicious users who are providing dishonest feedbacks to upgrade or degrade the reputation score for personal or professional reasons. The system should also reduce the impact of unfair ratings and improve trust on reputation score.
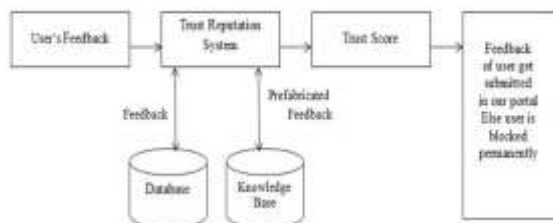
III. Proposed Solution
The main objectives of this work are:
- To detect malicious users who provide dishonest ratings.
- To recover reputation score of the target item that receives dishonest ratings.

- To analyze the given feedback given by user.
- To classify it as positive or negative or neutral.
- To avoid interference to normal items' reputation scores
- To prevent manipulation against the reputation system.
- To generate a better reliable global reputation score of the product.


The proposed work is the combination of two modules namely

        Module I: Genuinity detection for feedback providers

        Module II: Sentiment Analysis

Both parts will be implemented with different concepts and different techniques. Module I is implemented using Naive Bayes algorithm, Supervised machine learning approach. Module II is implemented with positive and negative words list from dictionaries. The System Block diagram for this project is shown in figure 4. Feedback given by user is accepted only if that user is genuine otherwise it is discarded. Genuinity detection for every user is done by questionnaire. Questionnaire results, dictionaries and feedbacks are stored in separate sections.

The user will give opinion about any product. POS Tagged output will divide the opinion in the tokens of words. It will help us to determine opiniated words present in the opinion. We have list of opinion words in the dictionary. We can thus find out the opinion is made positive or negative. Polarity of opinion will be detected. The user who wants to submit their opinion will be redirected to the questionnaire.
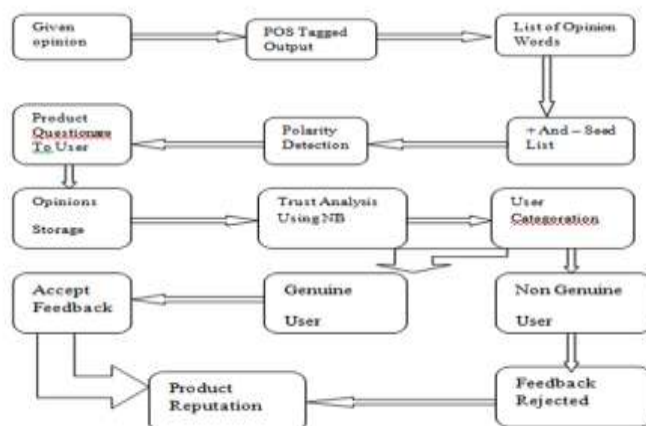
Every user (feedback provider) is redirected to some set of questions reflecting different features of the product. User is genuine if his opinion about product matches with majority of users. Only those feedbacks are considered which are given by genuine users. Product Reputation is obtained after rejecting Non Genuine feedback and comparison is shown between product rating of Genuine opinions and Non Genuine opinions.

IV. CONCLUSION

In this paper, we propose a Trust Reputation System based on the analysis of the opinion and questionnaire filled by user. The proposed reputation system calculates trust reputation score of the product. It also compares and show the difference in product rating with genuine and non genuine opinions. As a perspective, we will relieve these assumptions in our experimental analysis broadly to estimate the efficiency, the precision and the development of our Trust Reputation System.

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