International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395 -0056
Volume: 04 Issue: 02 | Feb -2017 www.irjet.net p-ISSN: 2395-0072

A SURVEY ON VARIOUS REPUTATION ASSESSMENT TECHNIQUES

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Abstract – *Nowadays evaluating the reputation of products has become an important key factor. Reputation is a result of social evaluation that helps to determine the level of trustworthiness on a set of criteria. In general, it is defined as a component of identity. Trustworthiness provides an environment which enables the users to interact each other with much ease. Trust and reputation plays an important role in almost all social platforms. This paper focuses on various reputation evaluation techniques and determines how trustworthiness could be attained in a more specific way.*

Key Words: Reputation, trust, malicious ratings, PHAT, Belief propagation

1. INTRODUCTION

Almost in all online based purchases, consumers share their opinion regarding the products through ratings. The overall reputation of the products is analyzed by taking the aggregated score of all ratings given by the users. Reputation plays an important role in evaluating the products. Trustworthiness of a reputation is yet another factor to be considered as it can be manipulated easily by the occurrence of malicious ratings.

Various algorithms and techniques are developed in order to achieve trustworthiness. Some of them involve using clustering, classification, probability distributions, and hypothesis test methods etc for evaluating reputation and to eliminate malicious ratings, thereafter make the system trustworthy.

As various reputation measurement techniques are still at the infancy level, there are still many uninvestigated topics and areas worth research attention in order to fully leverage the potential of trustworthiness. In this paper different methods for evaluating reputation and thereby eliminating the occurrence of malicious ratings are studied so as to achieve trustworthiness.

2. LITERATURE SURVEY

In [1] Hyun-Kyo Oh, Sang-Wook Kim, Sunju Park, and Ming Zhou proposed a true reputation algorithm where the reputation was estimated depending on the confidence of the ratings given by the customers. The framework was designed so as to mitigate the occurrence of malicious ratings and thereby evaluate the trustworthiness of reputation. Confidence of rating was estimated based on user's activity, objectivity and consistency. User's activity was determined by the number of ratings given by the customers, objectivity was analyzed based on the deviation of rating and reputation and consistency was analyzed using box plot. Reputation of the products was adjusted based on the confidence of the rating.

In [2] Yafei Yang, Yan (Lindsay) Sun, Steven Kay, and Qing Yang proposed a set of statistical methods for the purpose of detecting collaborative malicious ratings and thereby a framework of trust enhanced rating aggregation system was developed. The major components involved in trust enhanced rating aggregation system are: Rating aggregator and Trust manager. Rating aggregation process was analyzed using arrival rate detection, model change detection, histogram detection and mean change detection which were applied independently. Trust manager analyzes the output which in turn helps to evaluate the trustworthiness of individual raters. The malicious ratings were removed rating filter and thereby the ratings are combined by the rating aggregation algorithm.

In [3] Xiaofeng Wang, Ling Liu, and Jinshu Su proposed a RLM model for the robust and diverse evaluation of reputation. Reputation evaluation method was determined by the two attributes such as reputation value and reputation prediction variance. Aggregation of feedbacks was computed using reputation prediction variance. Kalman aggregation method was designed for providing a robust evaluation of trust and also to aggregate feedbacks more accurately. Expectation Maximization algorithm was designed so as to defend against malicious and coordinated feedbacks and to obtain fair ratings. In addition to this a hypothesis testing is conducted to resist against malicious feedbacks from occurring.

In [4] Noura Limam and Raouf Boutaba presents a framework for reputation aware software service selection and rating. Selection algorithm is introduced in order to provide service recommendation with the aim of providing best possible choices for SaaS consumers. The best possible choices rely on certain factors like quality, cost and trust. Rating function is derived for the purpose of monitoring results and service cost and thereby to produce feedbacks without human intervention. Finally a reputation derivation model aggregates all the feedbacks into reputation considering time factor as a parameter and as a result the service ranking function aggregates the parameters such as

quality, cost and reputation into a single metric, hence useful for evaluating service offerings against each other.

In [5] Erman Ayday and Faramarz Fekri proposed a belief propagation algorithm for the design and evaluation of trust and reputation management systems. Belief propagation algorithm was designed to efficiently compute the marginal probability distributions for the purpose of achieving a probabilistic and belief propagation based approach. This approach models the reputation system on a factor graph. Factor graph was employed to depict how the consumers and service providers were related to each other on a graphical structure. With the usage of factor graph, the global functions were factorized into products of simpler local functions which are completely dependent on the subset of the variables. Marginal probability distributions representing the reputation values are computed by message passing mechanism between the nodes in a graph. Belief propagation approach computes reputation considering the quality of the service of service providers by using the feedbacks from the raters and hence determines the trustworthiness of the raters by analyzing their feedback about service providers. Belief propagation based approach depicts the effectiveness of filtering out malicious and unreliable reports based on probability distribution functions.

In[6] Yan Wu, ChunGang Yan, ZhiJun Ding, GuanJun Liu, PengWei Wang, ChangJun Jiang,and MengChu Zhou presents a two phase method for calculating service reputation. The first phase involves using a dynamic weight formula for calculating reputation and in sense it reflects out the reputation of the service in a tremendous way and the second phase uses an olfactory response formula in order to alleviate the negative effects due to unfair ratings. A threshold value is assigned for the identification of unfair ratings. Olfactory fatigue phenomenon helps the users to select more appropriate services and hence raise the positive experiences of the user.

In [7] Bixin Li, Li Liao, Hareton Leung, and Rui Song proposed PHAT which is a dynamic trust evaluation model considering both user's preferences and the impact of false ratings. PHAT model presents an approach where the user's preferences are mined from their requirements. These preferences determine the weight of each QoS attribute. Trust on a service is computed by combining the trust assigned on QoS attributes and the user's subjective ratings. Users are clustered under different groups based on their QoS preferences and the honesty of each group is determined based on a hybrid approach. Finally the weight assigned on ratings is dynamically adjusted while calculating the reputation of a service. PHAT model is demonstrated for the evaluation of trust and has diluted the occurrence of unfair ratings to a great extent.

In [8] Shangguang Wang, Zibin Zheng, Zhengping Wu, Michael R. Lyu, and Fangchun Yang proposed an approach for measuring reputation in web services. Firstly, the malicious ratings were detected with the help of cumulative sum control chart and the negative effect of subjective feedback preferences was employed using Pearson correlation coefficient. In addition to this, Bloom filter was introduced to prevent the malicious feedbacks from occurring, so as to enhance trustworthiness and achieve accurate results.

3. CONCLUSIONS

This paper provides an outline of reputation evaluation techniques so as to attain trustworthiness. Evaluating the reputation of products is found to be a broad area wherein many studies and researches have been carried out. The survey outlined various methods of eliminating false reputation problem and thereby makes the system more trustworthy. It could be seen that majority of the works involved a long step process, even making use of clustering, classification, and probability distributions and only few of them were focused on evaluating the confidence of rating and thereafter achieve trustworthiness.

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