Trust Management Model In Online Auctions Using Multi Agents

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***Abstract*- This paper is aimed at the stipulations which arise in the traditional online auctions as a result of various anomalies in the reputation and trust calculation mechanism. We try to improve the scalability and efficiency of the online auctions by providing efficient trust management methodology considering several factors into consideration. A comparison between the performance of the auctions system with and without the agent methodology is done.**

***Keywords*- Agent Technology, JADE, Optimal Price, Trust Management**

I. INTRODUCTION

An online auction is simply defined as a virtual marketplace hosted on the Internet to match buyers and sellers of goods around the globe regardless of the physical limitations of traditional auctions such as geography, presence, time, and space. Online auctions operate different protocols including English, Dutch, First-Price Sealed Bid and Vickery with different properties for each one of these protocols. Here in this system we implement the different auctions and also help the users to decide upon the optimal price of the product considering a specific set of parameters. Our main interest would be to work on the reputation and trustworthiness of the participants in the online auctions. Since the participants in the auctions do not know the details of the seller, they have no other option rather than to trust the feedback mechanisms provided implicitly. There is also the problem of the need for constant human monitoring.

II. RELATED WORK

The present e-commerce applications on the web either use the accumulative model or the ratio methodology to calculate the trust worthiness of a client. The accumulative model uses the summation of the feedbacks of other users which can be either 0 or 1 or -1. The ratio model refers to the ratio of the positive feedbacks to the total number of feedbacks. But these both neglect the possibility of malicious users and do not take the credibility of the person who is rating the other client into account. The accumulative model makes use of the summation of the reputations which are calculated over time.

To avoid this problem a new method of considering weight values for the rater. Here the weight values are in the closed interval of 0 to 1 and these are used to calculate the final feedback values which are used to compute the trust. The present mechanisms do not take the dynamic nature of these online auctions into consideration and thus several subtle features like the decay of feedback and recent trust values etc. The calculation of trust at run time can be very scalable in certain situations but it leads to congestion in the network in most of the cases due to reasons like people who bid opportunistically.

The present day auction sites mostly require the users to constantly monitor the proceedings of the auction in which they are

involved. This can be a rather tiresome business. To avoid this problem agent technology is used.

III. FRAMEWORK

The frame work consists of various components like Auction agents, Trust management agent. The auction agent deals with the implementation of the type of auction specified. It also deals with the support provided to the user regarding the optimal price taking the parameters of quantity and priority of sales into account. The auction agent implements the concept of bundle bidding which aids in the process of decision making when a large number of products are being sold and a priority is attached to each product. We use this methodology to overcome the problems posed when a greedy algorithm model is used. The auction agent takes responsibility for the implementation of proxy bidding for each auction type. It takes the amount as input from the user and uses this as a threshold and bids on behalf of the user and thus the user need not monitor the proceedings at all times.

This methodology is achieved by the usage of JADE agent technology. An agent is a software entity that can perform information-related tasks without ongoing human supervision.

The trust management agent is used to calculate the reputation of all the users taking part in the auctions either directly or indirectly. The reputation levels depict the trustworthiness of the person who is hosting the product. This can be done on the basis of several factors like feedback decay, recent price, rater's trustworthiness etc. The Feedback rating concept is also applied in which several parameters known as the reputation critical attributes are used to rate the sellers. In feedback rating the rater generally rates the host according to several critical attributes which may be the quality of service provided, the type of technical support provided, the delivery of the product, the item's condition on delivery etc. Thus feedback rating as considered in the present methodologies is not a scalar but a vector quantity. Thus it can lie in the closed interval of -1 to 1 and not strictly one of the three extremes.

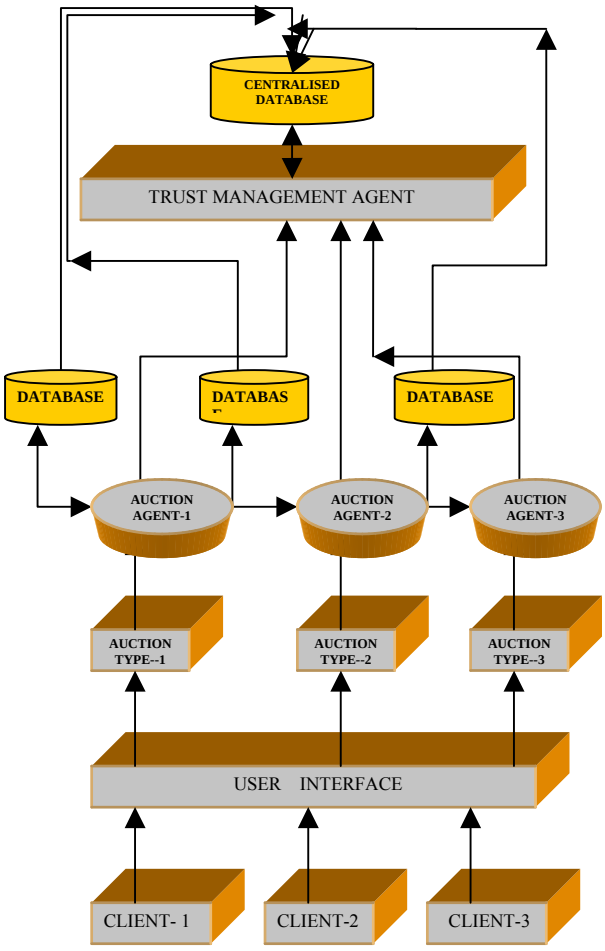

Fig.1 Frame work

We must also take into consideration the other factors of influence such as the trust value calculated in the nearest past and the time delay from the recent trust value, the value or the final outcome of the transaction. Thus, the trust management agent calculates the reputation and trust worthiness of the client taking into consideration the number of participants from the time t-1 to t and it also includes the weight values which come from the experience and is based on the company.

The weight values are normalised. We also calculate the rater's trust worthiness using a third client. We also use the ratio methodology. Thus the trust management agent involves the functionalities of all the

previous methods such as the accumulative and the ratio methodologies.

IV. AGENT TECHNOLOGY

Agent technology is used for the task of automating e-commerce business processes in view of bringing efficiency, scalability and profitability to businesses and individual users. Agent technologies can be used to depict the real world scenarios in the field of e-commerce onto the virtual screen.

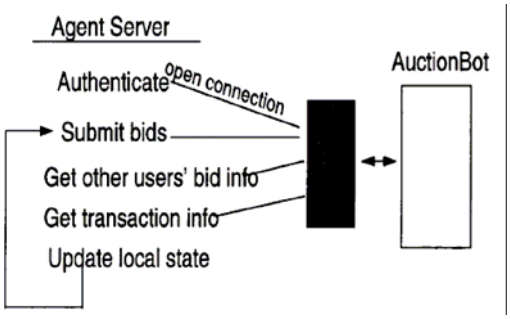

Fig.2 Communication with Agent

JADE 3.1 agent platform is used to implement the agents. JADE is one of the best modern agent environments. It is open-source and is FIPA compliant and runs on a variety of operating systems which include Windows and Linux. It's very scalable because as the load on the server increases the Jade agent technology can be used for the load balancing phenomenon. The negotiations which take place between the host of the auction and the customer are performed in Jade containers. The Main container and the other containers are used to take care of the scalability issues.

V. TRUST MANAGEMENT

The trust calculation is done based on the reputation of the person who is rating. Consider 'x' as the person whose weight value is needed for the trustworthiness. Let 'y' be another user who has a common partner set with 'x'. The weight value of the trust worthiness of x is calculated by comparing the ratings given by x to each and every element of the common set as compared to the ratings given to the same element by y. Several critical attributes are taken into consideration while the rating procedure is done.

The critical attributes mainly revolve around the extent of customer satisfaction, the quality of the product when received as compared to that of promised quality by the vendor etc. The calculation of optimal price is required to further enhance the accuracy in the prediction of the weight values. This is based on the experience of the vendors or the hosts of the auctions. The effect of the optimal price on the trustworthiness is solely dependent on the type of tangible goods sold and the type of services provided and the type of customers who visit it. The optimal price is calculated as the function of the priority with which the product has to be sold, the number of days and the initial price.

The following code snippet is used to calculate the optimal reserve price.

```
J = 1;
P = 1- P;
For(  i=1; i<=d; i++ )
{
J= J*(π - 0.5);
Optimal Price = initial price + (J*P)
+ ((0.1)*initial);
}
```

Where

'P' is the priority.

'd' is number of days for auction.

VI. CONCLUSION AND FUTURE WORK

Work is done on the task of increasing the reliability of these feedback mechanisms taking certain parameters into consideration. The impact of malicious feedbacks is reduced. There are many other real time factors which are necessary to be taken into consideration to depict the dynamic nature of the present world scenario of e-auctions.

This project was designed for a specific type of auction (synchronous, Mth-price auctions) but in the future

we would like to generalize our agents to participate in other types of auctions as well. For example, stock exchanges are asynchronous double auctions. Another

future enhancement will be to add additional bidding strategies. We will then be collecting detailed per- formance statistics to determine which strategies perform better under which types of auctions. We would also like to compare these strategies to human strategies. We will also provide semi-automated bidding services which allow a human to have control over the bidding process.

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