

Design and Research of One-to-Many Multi-attribute Negotiation Support System Based on User Acceptance Behavior Model

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Abstract: With the development of information technology and the popularity of personal computers, e-commerce has entered millions of households. Negotiation is the key link in real business activities. However, although the theoretical research of negotiating support systems for e-commerce has matured in recent years, it is difficult to achieve support for one-to-many preparatory negotiation and integrated application capabilities, promotion and application in business environment for e-commerce users, which is not only a bottleneck that restricts the rapid development of e-commerce, but also a dilemma in the research field of negotiating support systems. In this regard, this paper studies the process of preparation and negotiation before and after negotiations in the one-to-many negotiation that is most closely related to e-commerce, and establish a one-to-many pre-negotiation negotiation support system to solve the above problems.

1. Introduction

The negotiating support model is to provide a strong interaction (offering and counter-offer) ability for the middleman by providing an assisted negotiation platform (which can include the function as a third party negotiation mediator), applying various modeling and group analysis techniques. Other methods provide support for negotiation process and negotiation solutions. The main purpose is to improve the effectiveness of negotiations and promote successful negotiations. This kind of research has received extensive attention from scholars at home and abroad. It has become the mainstream of negotiation support theory research and application, and has made great progress in research and application. However, at present, the negotiation support model mainly supports the two-party negotiation, and there are few issues concerning the one-to-many negotiation that exist in reality. The auction system (including auctions and reverse auctions) mainly supports one-to-many bidding or auction activities. The general auction system involves only one attribute or requirement of the price and can be seen as a simple special case of the one-to-many negotiation system. The auction process is relatively simple and easy to automate. There is not much exchange of information between the people in the game, and their openness and inherent competition compel bidders to make a real evaluation. In recent years, they have achieved very successful applications on the Internet. For example, eBay in the US and eBay (<http://www.eachnet.com>) in China are typical e-auction models. But the winner problem has been plaguing the auction system. This is why the auction system can well solve the single-attribute one-to-many negotiation problem, but there are many difficulties in supporting multi-attribute one-to-many negotiation, especially multi-attribute one-to-many negotiation with unclear auction utility functions. . Specifically, the auction system can be successfully run requires a premise, that requires the auctioneer to accurately describe its evaluation rules or utility functions, and to evaluate multiple bidders program. In reality, the vast majority of auctioneers do not possess their specific knowledge about the products or services they wish to trade, and it is difficult or even impossible to determine their corresponding utility functions. This situation is particularly common in purchase-driven multi-attribute reverse auctions. Examples include the purchase of ERP software by companies, personal purchases of cars, and so on. In this case, the auction system will not be able to provide negotiation support for the auctioneer.

2. Analysis on Needs of One-to-many Negotiation Mechanism and Negotiation Support System

The one-to-many negotiation issue is a branch of the negotiation issue. This section will start with an analysis of the definition and classification of the general negotiation, give the definition of one-to-many negotiation and analyze the characteristics of one-to-many negotiation compared with other types of negotiations.

The term "negotiation negotiation" comes from the Latin "negotium", which means "talking about buying, selling, and trading." Scholars at home and abroad stand in different fields and perspectives and give different interpretations of the concept of negotiation. As of now, there are at least a hundred or more definitions of negotiable negotiations that can be collected. There is no difference in the concept of these definitions, but they emphasize only one aspect of the negotiation or a certain function. Looking at various different definitions, negotiation has the following characteristics: (1) Negotiation is a process of adjusting parts to achieve overall balance. For all parties involved in the negotiation, negotiation is an interactive process of "giving" and "accepting." When there are disagreements in the negotiations, there is very little unilateral concession. It is usually the two sides that make concessions successively above their own bottom line. (2) Negotiation is a unified process of negotiating cooperation and conflict among all parties. The negotiating parties in the negotiations are all looking for opportunities for cooperation in mutual conflicts. This has caused the agreement reached between the negotiating parties not to be a static mechanical process, or a simple process that is only affected by one or two factors, but rather a dialectical unification process that is affected by various complicated factors. (3) The negotiation results have fair uncertainty. It is difficult to ensure that the outcome of the negotiations is equal to all parties. (4) Although the outcome of the negotiations is unfair, as long as the parties involved in the negotiations have veto power for the negotiations, the negotiation process is considered to be equal.

The direct reason for negotiating is because the parties involved in the negotiations have their own needs, or some of the organizations they represent have certain needs. The satisfaction of one party may involve and affect the satisfaction of other parties. No party can ignore the needs of other parties. Therefore, the purpose of the negotiations is not only to pursue their own needs, but to negotiate through the exchange of views and jointly find a mutually acceptable solution. In addition, negotiations are not unlimited to meet their own interests, but there are certain limits of interest. Neilenburg said: "The negotiation is not a chess game, and it is not a requirement to determine the outcome. Negotiation is not a war. It needs to be eliminated or put to death. Negotiation is precisely a mutually beneficial cooperation." Therefore, negotiation is both a process of cooperation and a process of competition; that is, negotiators seek a balance between competition and cooperation through different modes of negotiation. The forms of negotiation are various and there are many types of corresponding negotiations. According to the number of interested parties participating in the negotiation, the negotiations can be divided into two-party negotiation, one-to-many negotiation and multi-party negotiation; according to the number of attributes of the negotiation issues, the negotiations can be divided into single-attribute negotiation and multi-attribute negotiation; the distribution of interests can be based on the negotiation. Negotiations are divided into zero and negotiation and win-win negotiations. According to the way in which the results of the negotiations are achieved, negotiations can be divided into two kinds, negotiation and arbitration. Negotiated negotiation is a typical meaning of negotiation. Such negotiations rely on the negotiation parties to make concessions to each other to achieve the final result. Arbitration negotiations are also called "interpretation" and are actions by third parties invited by the parties to the conflict or appointed by laws and regulations to hear the disagreement between the parties to the dispute. It is like court debates, auctions, bidding, etc.

3. Design and Implementation of One-to-many Negotiation Support System

One-to-many negotiation is a negotiation conducted by one party and many parties at the same

time. The interaction between the multi-party negotiators during negotiations is more complicated than the two-party negotiation. Normally in the two-party negotiation, the negotiation support system provides the system proposal according to the established negotiation support algorithm after collecting the negotiation of each round of the negotiation parties. In this process, the negotiators interacted directly and the system did not play a significant role in coordinating the negotiation process. Even in many cases, the system only provides the negotiating parties with an information exchange platform that integrates video and audio communications, whiteboards, and other technologies. At the same time, the input required by the two-party negotiation support algorithm is also relatively small. Under normal circumstances, only the two parties can calculate the corresponding system coordination plan in the same round. It can be said that the combination of the negotiation process support solution and the negotiation support algorithm in the two-party negotiation support system is relatively loose. Therefore, the researchers pay more attention to the role of auxiliary interaction in designing the negotiation process support model of the two-party negotiation support system. One-to-many negotiations involve multiple negotiators. The system designed to support such negotiation will have to consider such issues as the negotiators' negotiation and exchange of negotiations and the negotiation process management. More importantly, since the one-to-many negotiation support algorithm needs to comprehensively consider the issuing status of each negotiator, it is apparent that it is difficult for the negotiating parties to report their plans at the same time in each round. Even in many cases, a certain negotiating party may abnormally withdraw from the negotiation process due to problems such as network failure. At this time, it is obviously inefficient if the negotiation support system has to wait for all negotiators to issue an offer before continuing the negotiation process. If you neglect to negotiate directly after the negotiators have collected the remaining negotiators' offers, the negotiated parties may offer better solutions because the negligible negotiators may have no effect. It can be seen that for one-to-many negotiation, how to design the negotiation process to ensure that the negotiation can proceed smoothly is a very important issue. The one-to-many negotiation conducted by the multi-party negotiators on the network is similar in form to an electronic conference. Therefore, in the process of organizing one-to-many negotiation, it is possible to learn from the process model of the electronic conference system. However, in essence, one-to-many negotiation is not an electronic conference. The participants in the electronic conference discussed the same issue in order to reach a consensus. There is no concept of cooperation and competition. In the one-to-many negotiation, the negotiation between multiple parties competes for cooperation with the negotiating party, which makes the negotiation process organization of one-to-many negotiation unable to completely copy the electronic conference process model.

The realistic one-to-many business process can be roughly divided into four stages. (1) Information search phase At this stage, the purchaser (demand side) collects potential suppliers' supply information for use by the screening supplier; (2) Screening and convening negotiations at multiple stages At this stage, the demand side analyzes the supply Business situation screening and convening of appropriate suppliers to form one-to-many negotiation; (3) One-to-many negotiation stage At this stage, the demand side initiates negotiations with multiple suppliers to find the most satisfactory solution as possible; (4) Implementation phase At this stage, the demand side signs a contract after reaching an agreement with a supplier. The supplier provides products and services. From the above process, we can see that business activities are generally initiated by the demand side and actively look for the corresponding supply side. The supply side is to negotiate multiple parties and generally wait for the demand side to convene after showing the information of the products or services that they can provide. Traditional one-to-many negotiation is a long and inefficient process. The system goal of the one-to-many negotiation support system is to provide a reasonable and efficient one-to-many negotiation support platform for this problem of traditional one-to-many negotiation.

The negotiation process is mainly the interaction process between User Agents. The specific process is that after the negotiating convener obtains the target negotiating object, the negotiating convening message is sent to these objects in turn, the target object matches according to the

inference rules convened by the negotiation, and the target object that has agreed to convene subsequently sends a response message, and the User Agent is within the specified time. (Set to 5 minutes) Collect and organize the response message, determine the candidate negotiation object set, and then call the gray target algorithm to obtain the final negotiation object from the candidate set to determine the negotiation multi-party set. In the pre-negotiation process, the User Agent, Mediator Agent, and System Agent participate in the process. The negotiating party's User Agent generates a corresponding number of Mediator Agents according to the number of negotiating parties before the pre-negotiation starts. These Mediator Agents negotiate a multi-party User Agent to complete a bargaining and return the results to the User Agent, while the negotiating party's User Agent is mainly After the one-to-one intention value is determined, one-to-many intent values are generated based on the evaluation of each group's intention value.

4. Conclusion

For the one-to-many negotiation support system, it has been difficult to promote and apply in the actual system of e-commerce because of the lack of support and integrated application capabilities for e-commerce users before the negotiation and preparation of the negotiations. This paper will discuss the e-commerce in the one-to-many negotiation process. The most closely negotiated preparations for negotiations and the formation of the negotiations are independent and dedicated to research to solve this problem.

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