

A Novel E-commerce Negotiation Optimization Model Based on Improved Genetic Algorithm

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Abstract. Electronic commerce has rapidly become a major player in the business market. This paper proposes a new electronic commerce negotiation optimization model based on improved genetic algorithm which depends on not only price, but also other factors of commodity. The proposed model illustrates the relationship between the business components required to support the e-commerce processes with the value creation factor and the controlling complexity. The experiment results show that the proposed algorithm can gain the optimal negotiation result more efficiently than other three kinds of negotiation algorithms in competitive bilateral multi-issue negotiation.

Introduction

Electronic commerce is a new way of trading on the increasing popular computer network. E-commerce usually refers to the wide range of business and trade activities around the world, the Internet an open network environment, based on browser/server applications, the way buyers and sellers are not met in various business activities, to achieve the consumer's online shopping, online transactions between businesses and online electronic payments and a variety of business activities, trading activities, financial activities and related service activities of a new business model [1]. E-commerce is the use of computer technology, network technology and telecommunications technology, electronic, digital and network in the entire business process [2]. E-commerce is the use of digital information technology, and continuing the process of optimizing the activities of the enterprise. With the increase in the number of domestic Internet use, the use of the Internet online shopping and payment by bank card consumption has become increasingly popular, market share is growing rapidly, and e-commerce sites are endless. The most common e-commerce security mechanism has two kinds of SSL (Secure Socket Layer) and SET (Secure Electronic Transaction protocol).

The success of the sale of an insurance policy depends on how good the requirements of the insurer have been matched with the terms of the policy. The greatest contribution of e-commerce is that the traditional sales model, channel by means of electronic commercial trade of virtualization, networking, personalization and integration [3]. E-commerce covers a wide range, generally can be divided into business to business, business-to-consumers, and consumers to consumers, business-to-government, and other four kinds of model, one of the major enterprises, business-to-consumer mode. The core of the C2B model through the aggregation of dispersed but a huge number of users to form a powerful buying group, in order to change the weak position of the user one-on-one bid in the B2C model, so enjoy to pay the price of the large wholesalers commodity interests.

The development of e-commerce has gone through five stages, five stages are as follows: (1) e-mail stage: This stage can be considered since the 1970s, the growth of the average traffic speed several times each year. (2) The information phase: Since 1995, Web technology, information

dissemination system, explosive grows up to become the main applications of the Internet. (3) e-commerce stage. (4) The entire e-commerce stage. (5) stage of the wisdom of e-commerce: Internet information fragmentation and cloud computing technologies become more mature, active Internet marketing model, homeopathy out of the I-Commerce (individual the Commerce), e-commerce away from the traditional sales model students onto the Internet the status of active, interactive, customer care, multi-angle with the user at a deep level communication.

E-commerce negotiation is an important issue in e-commerce research is a vital link in e-commerce activities [4]. In order to reach an agreement about a particular insurance product a negotiation process is started by the broker. This negotiation process comprises several rounds, starting when the broker sends an announcement for all the insurer agents in the market. The development of e-commerce has great practical significance. E-business negotiation is the traditional negotiation theory and methods used in modern e-commerce activities, with the help of computer and network technology to solve both sides of the conflict in business negotiations, the negotiating parties to reach a consistency, an important way to complete business activities. In e-commerce negotiation, consultation models and algorithms are the focus of attention and critical issues of domestic and foreign experts and scholars. The negotiating parties in the negotiation process in accordance with their own interests and other consultations to seek to maximize the benefits and allowed me to reach a consensus as possible [5]. At present, there are a lot of negotiation models and algorithms have been proposed, but of the same objects and solve the problem facing the environment, has yet to generic e-negotiation model and algorithms.

The purpose of this paper is to fill a void in the research on B2B e-markets in China. We seek to develop a conceptual model that is inherently suitable for analyzing the complexity of B2B e-market. The rest of this paper is organized as follows: a brief introduction to the e-commerce negotiation models is given in section 2. Section 3 describes the e-commerce negotiation algorithm. In Section 4 summarizes the results and draws a general conclusion.

E-commerce negotiation models

In order to effectively solve the conflict of consultations depends on the negotiation model. Negotiation Model of e-commerce mainly involves two aspects: the model on the model of the negotiation protocol and negotiation strategy. The negotiation protocol is the criteria of the negotiating parties are subject to the constraints of each other's behavior [6]. Depending on the consultation model, the following three consultations: (1) service providers (service providers only provide consultation service, but does not participate in the consultation) to provide support for consultations; (2) the buyer or the seller agree on; (3) third-party participate in the consultation.

Consultation services for the different needs of users require different negotiation protocol to meet their objectives. Rema Ananthanarayanan, such as the establishment of a bilateral negotiation model, the negotiation process is divided into two phases, the consultation before the stage and the consultation phase. Pre-consultation stage through consultation on the agreement reached consistency; the consultation phase to expand the possible solution of the search space, multi-attribute negotiation to achieve a "double dip" in the bid round. The purpose of the model of strong, clear division of labor in two phases, the higher the efficiency of completion of the consultation. H.Ouchiama proposed an evolutionary negotiation model, in addition to the basic negotiation, but also with the growth of knowledge and experience to adapt to different levels of people in the negotiation process needs. The model targeted to meet the needs of persons of different preferences and learning, with a certain degree of intelligence.

When in the course of consultations, both sides declined to disclose more information stalemate of the need for third-party help to adjust the protocol model the Raymond J.Lin proposed consultations, not only to ensure a rational strategy, but also produce a fair and structural results, the model to ensure the efficiency, stability and predictability of consultation.

The negotiation strategy is a consultation in every aspect of the consultation process execution behavior or tactics adopted different negotiation require different negotiation strategies. More methods and research perspective, but the model focuses on the negotiation strategy two factors in the effectiveness of the consultation strategy and preferences [7]. In the choice of goods, the buyer will take into account the multiple attributes of the goods by a utility function to calculate the best interests of the Mokdong Chung et al proposed the evaluation of the utility function of the negotiation model is based on the special and general knowledge, the former based on MAUT (the multi-attribute utility theory), while the latter is based on the past success of the transaction history and simple heuristic algorithm. As used only the MAUT will be caught in the incomplete information situation, the method uses a combination of two kinds of knowledge, you can avoid the occurrence of the above to arrive at a more reasonable utility. For specific orders, T.Calosso a B2B model, analysis model, the model used to calculate the utility function of customers and suppliers and the acceptable range, able to determine both the Pareto optimal boundary, but it is still need to break through is how to achieve a number of customers and suppliers on multiple orders at the same time consultation. Auto-negotiation belief update agent to adjust some of the important parameters to change their behavior can be embedded in personal beliefs different needs. The advantage of this model lies in its flexibility and ease of use.

The negotiation is an iterative process based on the preferences of both sides of bids and counter bids, the two sides bid to make decisions, influence diagram is a tool of decision-making theory. Chhaya Mudgal, such as the use of influence diagrams modeling to generate decision-making model and rival model, this strategy than the direct increment or decrement of decision-making can lead to greater advantage. However, if both use the influence diagram modeling, then begin to negotiate at a disadvantage, and consultations on the failure rate will be significantly increased [8]. In the consultation process, consultation needs to continue to access each other's preferences, to improve their strategies in order to maximize benefits. Raymond, YKLau heart Yang Bayesian learning method for learning the opponent's preferences, it is a dialogue based on past negotiation history and the current consultation. This approach enables the formation of a good balance between the personal interests to maximize the acceptable bid, but also more effective than other non-learning mechanism. The purpose of consultation is to solve the conflict, the graphical model is expressed, analysis, and an effective tool to resolve strategic conflicts. Dr. Huang etc. improved the conflict graphical model (MGMCR) applications in the business negotiation support system has made new progress, through the analysis of preference in each situation to determine the stability of the situation in order to get the results of the negotiations, and greatly simplifies the model analog and calculated to improve the applicability of the Nss (negotiation support system), but it applies only to the tactical negotiation support system.

E-commerce negotiations Algorithm

With the vigorous development of e-commerce online transaction, the transaction need to be resolved, consultations of the e-commerce transactions is one of them. From the speed of the negotiation algorithm for solving the genetic algorithm have fast optimization of the global convergence and parallelism optimization and simulation of natural characteristics of the process to solve the optimal problem, suitable for use for the negotiating parties to provide satisfactory coordination solution [9]. But this solution is a prerequisite; both sides must be the agent preferences clear and without first giving the quantitative identity, negotiations for the dynamic and fuzzy preference requires further study. On the basis of the genetic algorithm, the chaotic mechanism to introduce genetic algorithm, and in the search to necessarily guarantee optimal solution as the center continues to compress the search space of optimization variables, the algorithm speed. This will not only overcome the disadvantage of premature convergence of genetic algorithm to solve the introduction of chaos after the genetic algorithm converges slowly. Fig.1 shows the One-to-many negotiation scheme.

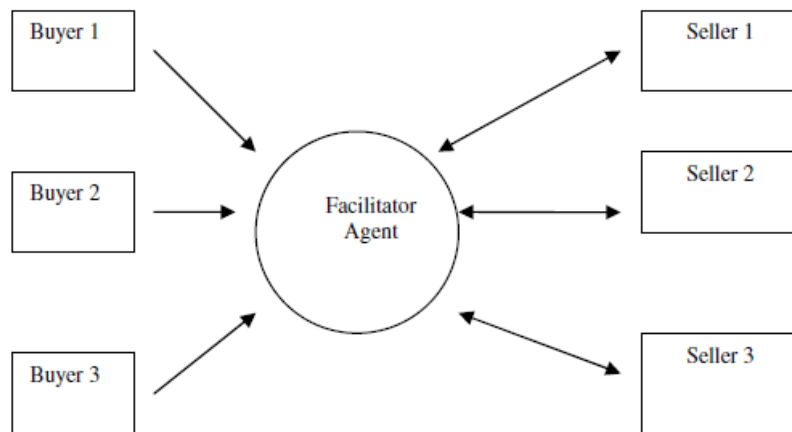


Fig.1. One-to-many negotiation scheme

In order to improve the final quality of the solution, experts and scholars to conduct more in-depth research. Chen of JH and other trusted third-party game algorithm, the algorithm is expanded from the traditional game algorithm, combined with a certain consultation mechanism to achieve the Nash equilibrium or Nash equilibrium. Environment of bilateral consultations, Haifei have proposed a Pareto optimal solution algorithm, using the premise of negotiated agent preferences are not mutually exclusive, and in consultation before the use of more effective, because it can reduce to the find Pareto optimal solution efforts. The neural network has the ability to learn, using the BP neural network learning, through training on the user's shopping preferences and enable the agent to obtain a set of rules contains user preferences feature as the basis of the reasoning in the consultation process, the results of each negotiation as a learning sample in order to improve the Agent the ability to adapt to market changes. Immune algorithm has fast convergence of the search space, the inherent parallelism and simulation of the immune system to solve the optimization problem characteristics, the use of virtual immune algorithm to provide solutions to support e-commerce negotiation for the negotiators to provide the optimal solution or near optimal solution. Later, it was suggested that the immune algorithm, this method can avoid falling into local optimal solution, and can find an acceptable solution.

The critical factors of e-commerce negotiation strategy, good or bad choice because the strategy is directly related to the interests of the negotiators. The evaluation model through the evaluation of the effectiveness or preferences, choose a more suitable models and methods, of special significance to the whole consultation process. Evaluation model to track a dynamic marketing strategy to effectively grasp of market information, provide strong support for the negotiation process.

Traditional search methods are single-point search algorithm, namely, by certain rules, the problem solution from the search space point to another. Multi-peak distribution of the search space, this peer-to-peer search methods are often caught up in a local optimal solution. Genetic algorithm is an imitation of biological systems, gene evolution iterative search algorithm, and the basic idea from the United States Michigan University Professor J.Holland. Due to the calculation of the overall optimization strategy and optimization of genetic algorithm does not rely on gradient information, so it has a strong global search capability, global optimal solution in the solution space, there is strong approximation ability.

Conclusions

Booming e-commerce on a global scale, due to the popularity of computer and network technology development, people are not satisfied with traditional consultation on the desktop, but more inclined to not rigidly stick to the space-time electronic consultation, how to better the traditional negotiation model the perfect combination of modern science and technology, how to use the existing models and algorithms to achieve more intelligent negotiation system is the main problem facing us in the future. Our platform for automatic insurance brokering services is now ready to be exploited for future experiments in several realistic scenarios.

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