

THE ROLE OF AGENTS IN NEGOTIATION IN E-COMMERCE

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Abstract

Negotiation is one of the established processes for an interaction between a buyer and a seller to reach an agreement stage where both of them are at a profitable state of business. Various classical, as well as modern intelligent computing methods such as knowledge-based systems (KBS), case-based reasoning (CBR), artificial neural nets (ANN), and genetic algorithm (GA), have been deployed to implement the various steps in a negotiation process. Multi-agent systems (MAS) have also been used to represent the buyers and sellers as agents and the broker as a coordinator agent. Very limited numbers of researchers have implemented the negotiation process. We have paid attention to the cognitive parameter such as preference, desire, intention, commitment, capability, trust, etc. as cognitive parameters for the negotiation of buyer and seller agents. Many different approaches for the negotiation-based selection of buyer agents have been reported in the literature. These approaches differ in procedures, technologies, and methods.

Keywords: *Multi-agent, Cognitive, Buyer, Seller, Knowledge based system, Artificial Neural Nets*

Introduction

1. Negotiation

Negotiation is one of the established processes for an interaction between a buyer and a seller to reach an agreement stage where both of them are at a profitable state of business. Various classical, as well as modern intelligent computing methods such as knowledge-based systems (KBS), case-based reasoning (CBR), artificial neural nets (ANN), and genetic algorithm (GA), have been deployed to implement the various steps in a negotiation process. Multi-agent systems (MAS) have also been used to represent the buyers and sellers as agents and the broker as a coordinator agent. The buyer agent constraints are related to price, quality, quantity, brand, payment mode, etc.

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The seller agent constraints are related to the price and quality (Jennings 2003). Very limited numbers of researchers have implemented the negotiation process. We have paid attention to the cognitive parameter such as preference, desire, intention, commitment, capability, trust, etc. as cognitive parameters for the negotiation of buyer and seller agents.

Several approaches for the negotiation-based selection of buyer agents have been reported in the literature. These approaches differ in procedures, technologies, and methods. The model will try to describe in this work provides interaction between buyer agents and seller agents through broker agent and customer orientation based selection of potential buyer agent for valuable seller agent for negotiation in e-commerce. We will describe the application of cognitive parameters based on agent selection for negotiation in the purchased domain in a cooperative system. In this domain, the buyer agent has a set of requirements, and a set of seller agents fulfill the buyer agent's requirements through a cooperative negotiation mechanism. We will further describe the customer orientation-based Multi-agent system in the negotiation process.

2. Types of Agents

Agents are people who represent the interests of the principal decision-makers. They act on the principal's behalf with varying degrees of authority. They are employed in negotiations specifically because of their expertise, specialized knowledge, and experience.

2.1 Independent Agents

Independent agents must be compensated for their services. Many of these independent agents earn their income through commissions. The more an agent sells, then the more they earn in commission. It is not uncommon for an independent agent to inflate the sale to increase their commission. Independent agents are also interested in the enhancement of their professional reputations. These agents desire, to not only attract more clients, but they also want to get the best clients. Some examples would include a real estate agent or a broker who negotiates the buying and selling of goods and services on behalf of another party.

1.2 Non-Independent Agents

This type of agent works directly for a company or organization. An example would be a company's purchasing department whose staff negotiates the lease or acquisition of supplies or equipment.

Another example would be a union representative acting on behalf of a union. The agent's know-how is the most constructive reason why they are employed by decision-makers to best represent their interests. The other side of the coin reveals that agents may have other self-serving interests of their own. These contrary interests might conflict with the aims of the people who engage in their services. Let's unravel this tangle so that we are aware of potential contrary interests that agents might bring to the table.

2.3 Intelligent Agents

In this type of agent, we attempt to achieve one-to-many negotiation by conducting several coordinated simultaneous one-to-one negotiations. The previous version (Kowalczyk and Bui 2000) was directed at facilitating one-to-one multi-attribute negotiation. In our current prototype, several agents, all working on behalf of one party, negotiate individually with other parties. Each agent conducts a direct negotiation with a prospective seller or buyer. After each negotiation cycle, these agents report back to a coordinating agent which evaluates how well each agent has done and issues new instructions accordingly. Each agent conducts its reasoning by using constraint-based techniques for evaluating and generating offers. The intelligent agents autonomously negotiate multi-attribute terms of transactions in an e-commerce environment tested with the personal computer trading problem.

2.4 Interface Agents

An interface agent to be a program that can also affect the object's indirect manipulation interface but without explicit instruction from the user. The interface agent reads input that the user presents to the interface, and it can make changes to the objects the user sees on the screen, though not necessarily one-to-one with user actions.

The agent may observe many user inputs, over a long period, before deciding to take a single action, or single user input may launch a series of actions on the part of the agent, again, possibly over an extended period. An interface agent could be considered to be a "robot" whose sensors and effectors are the input and output capabilities of the interface and for that reason are sometimes also referred to as "Soft bots". Sometimes the interface agent is represented anthropomorphically as a face on the screen, such as in the Apple film Knowledge Navigator.

The best-known examples of interface agents are intelligent tutoring systems and context-sensitive help systems is a good example. In such systems, the user may operate the interface with complete disregard for the agent, but, if called upon, the agent may also display suggestions, or perform direct-manipulation actions on objects in the displayed interface, based on input implicitly collected from the user. Other kinds of interface agents may critique the user's behaviour, or augment the user's direct-manipulation actions with extra computed information that the user may find helpful.

2.5 Autonomous Agents

An autonomous agent is an agent program that operates in parallel with the user. Autonomy says that the agent is, conceptually at least, always running. The agent may discover a condition that might interest the user and independently decide to notify him or her. The agent may remain active based on previous input long after the user has issued other commands or has even turned the computer off. An assistant may not be of much practical help if he or she needs very explicit instruction all the time and constant supervision while carrying out actions. Assistants can be time-savers when they are allowed to act independently and concurrently. Allowing an interface agent to run off-line and in parallel with the user directing attention to other activities enables the user to truly delegate tasks to the agent.

Conclusion

It may be concluded that different approaches for the negotiation-based selection of buyer agents differ in procedures, technologies, and methods.

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