

Chapter 14

Bargaining Chip: Artificial Intelligence in Negotiation

Gordana Dobrijević

 <https://orcid.org/0000-0001-8250-6459>

Singidunum University, Belgrade, Serbia

ABSTRACT

Negotiation is one of the basic forms of interpersonal communication, especially important in contemporary business. Although we assume that only humans can engage in negotiations, there are many negotiation support systems and software agents designed to assist human negotiators before and during the process. They were developed to overcome human cognitive biases and limited ability to handle information. They can support human negotiators, but also be used in place of humans to carry out negotiations on their own. The aim of this chapter is to provide an overview of different types of electronic negotiation, most recent advances in that area, some challenges in electronic negotiation, and interaction between humans and agents in negotiation.

INTRODUCTION

Negotiation is a process in which two or more parties try to deal with their opposing interests and/or settle their disagreements. Many times we negotiate with others without realizing it. Negotiation happens any time we want to get something from other people, or they want to get something from us (Lewicki, Saunders, & Barry, 2010).

Even though negotiation is mainly a human activity, an increasingly important part of it has been taken over by artificial intelligence (AI) - negotiation support systems (NSS) and automated software agents, created to assist human negotiators or to negotiate instead of humans. Artificial intelligence today includes a number of technologies and tools, including natural language generation, speech recognition, decision management, robotic process automation, and virtual agents (Forrester, 2017). Among other things, AI can support negotiators with search techniques, argumentation, strategic reasoning, and learning techniques (Jonker, Hindriks, Wiggers, & Broekens, 2012).

DOI: 10.4018/978-1-7998-5077-9.ch014

Bargaining Chip

Since the 1990s, technical problems, NSS architecture, methods, and processes have been the focal point of the majority of the research on negotiation support systems (Pervan & Arnott, 2013). Relatively small number of studies has focused on human-agent interaction during negotiations. This interaction is an important factor of the automated agents' design, since they can play different functions in e-negotiations. The agents can be used as training tools, as support for human negotiators, negotiate on behalf of humans, or act as intermediaries between organizations or individuals, e.g. online auctions bidding (van Wissena, Galb, Kamphorstd, & Dignume, 2012).

Virtual agents range from simple chatbots to advanced systems. An effective software agent can help people with some laborious tasks and speed up the process. For example, they can serve as brokering agents. Using automated agents instead of people can lead to better negotiation outcomes, decreased costs, and fewer conflicts (Yang, Singhal, & Xu, 2012). Still, when negotiating about more important and complicated matters, participation of human decision makers is required. Automated agents can also be useful in negotiation analysis, e.g. to anticipate results at the beginning of the negotiation process between humans (Dobrijević, Boljanović, & Brdar, 2016).

This chapter is structured as follows. Human factors and limitations, as well as some reasons for development of negotiation support systems and automated agents, are briefly described in the first section. The second section gives an overview of e-negotiation types. The human-human, agent-agent, and human-agent interaction is examined in section three. Some challenges of e-negotiation are described in section four. The final parts of the chapter are future research directions and the conclusion.

The objective of this chapter is to make a review of different types of e-negotiation, state-of-the-art in that field, some challenges in electronic negotiation, and interaction between humans and agents in e-negotiation.

THE HUMAN SIDE OF NEGOTIATION

People usually see negotiations as either confrontational or cooperative. In confrontational negotiations, the parties look only for their own gain, which leads to a win-lose outcome. It is essentially a zero-sum game in which only one side wins, and the other party normally does not want to deal with that person again. In cooperative negotiations, also known as win-win approach, the participants look for mutual gain, creating value for all the parties, and a long-term relationship (Cohen, 2002).

Expanding on this concept, Fisher, Ury and Patton (2012) from the Harvard Negotiation Project introduced "principled negotiation." According to them, most negotiators adopt one of the two styles of positional bargaining: hard and soft. In hard positional bargaining people take and give up a series of positions, focusing on results only. On the other hand, many people recognize detrimental effects of hard bargaining on relationships, so they focus on reaching an agreement. The standard actions in this approach are making concessions and yielding to avoid conflicts. While it can be a good approach with family or friends, it is not necessarily useful in business. It makes a negotiator vulnerable to the other side if they have the hard positional approach. Fisher, Ury and Patton (2012) suggest using another approach - principled negotiation, based on objective criteria, creating multiple options, focusing on interests (not positions), and separating people from the problem. It is generally hard for people to follow these four principles, due to emotions, pressure, stubbornness, and complicated calculations needed to choose the optimal solution. The goal of principled negotiation is reaching a wise agreement, focusing on basic interest, mutually satisfying options and fair standards, while avoiding conflict.

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