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Automated Negotiation

The support of Artificial Intelligence

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1. Introduction

In general, entrepreneurs and executives spend more than 20% of their working time negotiating and resolving conflicts (Gettinger, Köszegi and Schoop, 2012); however, several studies have also shown that negotiators, when it comes to negotiating, bring significant value to the table. It has been demonstrated that collaborative potential maximizes the interests of the parties involved, though it is more complicated for the negotiators to reach *win-win* agreements, with both parties winning, due to the complexity of articulating multiple factors; the simpler course of action is to opt for a competitive, *win-lose* approach (one party gains what the other gives up, which is usual in transactions).

The lack of knowledge of the other party leads to negotiation with a competitive framework. Not having information on the interests and intentions of the other party creates a degree of insecurity, leading us to fall into the temptation of holding our ground in the negotiation. In the end, fear and insecurity lead us to a competitive approach.

The increase in interactions, possible coalitions, issues to be dealt with and potential agreements make it more difficult to meet the expectations of each party. The complexity sometimes leads to an agreement bias, that is, that not reaching an agreement is considered a failure. Negotiators that are too focused on an agreement do not usually sufficiently explore the value creation potential offered by the situation.

Finally, the negotiators' decision making is affected by excessive concentration on their own requirements and weaknesses, ignoring those of others. This internal focus makes us weaker and more vulnerable to tricks and deception, since we do not take the appropriate measures to assess and process all the information that comes to us during the negotiation. According to the Truth-Default Theory (Levine, 2014), human beings tend to assume that the other party (especially when unknown) is not providing us with true information.

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Faced with these blocking situations caused by high levels of uncertainty and a lack of information, negotiation support systems and automated agents offer solutions to improve the analysis and the results of the agreement.

2. Negotiation Support Systems

Negotiation support systems (NSS) are software that provide support in negotiations. In reality, an NSS is a type of *decision support system* (DSS) that helps with the decision-making process in complex situations. The objective of technological support is to make better decisions and negotiate in a more productive manner by reducing the negative effects of human interaction. Some of the negative effects are caused by cognitive biases.

Negotiators tend to consider issues separately, ignoring possible synergies and potential concessions that help to improve the result. They frequently "frame" the negotiation negatively, assessing their possible losses rather than considering the potential gains. They usually assume that the interests of the counterpart are opposed to their own.

NSS help the negotiator in four areas:

1. To understand all the factors and variables that affect their decision making better.
2. To examine the possible impact of the factors both on themselves and on their counterpart more effectively.
3. To interpret the expectations of both parties better.
4. To avoid or overcome emotional impact in a negotiation.

3. How do the NSS Operate to Complement and Improve the Negotiation?

The NSS can complement the process with different features: facilitation and communication, analysis of the negotiation and analysis of the decisions. It has been empirically demonstrated that their use improves the agreements reached in the negotiation. Negotiators that rely on an NSS display more collaborative behavior when compared to those that have access to the same information but do not have any support. When the negotiators were provided with graphical displays of the negotiation history, they showed greater support, expressed fewer negative emotions and talked more about impartiality. Additionally, they were more prepared to give ground when dealing with highly conflictive issues and were more satisfied with the results of the agreement (Gettinger, Köszegi and Schoop, 2012).

However, in potentially competitive negotiations, it has been demonstrated that the results are similar to those that do not rely on the support of NSS. In these situations, the negotiating parties tend to “split the difference”, reaching a reasonably effective and fair agreement (Goh, Teo, Wu and Wei, 2000). It can be said that if there is collaborative potential in a negotiation situation, the help of an NSS highlights this and helps the negotiator to avoid a mistaken competitive focus.

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3.1. Facilitation and Communication Support

This tool allows negotiators located in the same time but different places to exchange offers and counteroffers. It offers support features for communication, such as internal messaging or monitoring of the scope of negotiations. It can also be used as an automated mediator or advisor with the ability to suggest possible agreements.

Figure 1
Computer mediated negotiation

Source: Prepared by the authors.

For example, a pharmaceutical company wants to establish relations with a university so as to have better access to basic research and wants to develop joint research projects. The R&D Department mentions a list of projects on which the company would like to work. The company will commit to a quantity of money after negotiating it with the university. The negotiation centers on the drug and the money. In the same negotiation there are more stakeholders, for example, the Marketing Department, who would like to launch the products developed in a short time, which introduces a new variable. The Human Resources Department, in turn, could leverage this agreement to give access to more young talent such as scientists or students from the university, which would introduce a further variable: access to talent. The Finance Department will attempt to pay in such a way as to have reduced capital costs and thus greater liquidity, so now we also have the method of payment variable. The Accounts Department will be interested in the type of agreement so as to ensure compliance with all accounting regulations and so as to have the minimum impact in the form of taxes. So, the more stakeholders, the more variables. An NSS would help to prioritize and quantify the impact of the expectations and requirements of each stakeholder so as to reach a satisfactory agreement.

3.2. Decision Analysis Support

First of all, the negotiators specify their preferences on the attributes to be negotiated and subsequently the system calculates a utility function. Then, the system evaluates the offers and counteroffers based on the interests that they satisfy. The classification of these offers and their subsequent visualization allows the negotiator to decide on the best option.

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