2.0² G eNerationS – Avenues for the Next Generation of Pro-active Negotiation Support

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Keywords: e-negotiations, pro-active support, behavioral support, electronic agents

Extended Abstract

In order to help individuals to resolve negotiation problems researchers have developed electronic support systems facilitating negotiation processes. In general, electronic negotiation support (eNS) systems are computer systems that not only provide an electronic communication channel, but supplement it with additional support functions like decision support system for each negotiating party to improve decision quality and reach efficient agreements (Lim and Benbasat, 1992-93, Kersten and Noronha, 1999), communication and document support functions to improve communication quality and document handling (Schoop et al., 2003, Weigand et al., 2003), or behavioral support to increase flexibility and thereby the prospects of reaching an agreement in case of a stalemate (Druckman et al., 2004, Druckman et al., 2011). Researchers consider these components to be helpful in alleviating the negative impact of negotiator's cognitive limitations & biases, communication problems or socio-emotional problems which are detrimental to successful negotiation (Foroughi, 1998).

Empirical results of numerous negotiation experiments within the past decade provide evidence that negotiation support systems only partly succeed in their mission to reach better outcomes (Koeszegi et al., 2006, Gettinger et al., 2011). First of all, two major outcome dimensions, namely high quality of agreement (efficiency) and good prospects of reaching an agreement (effectiveness) are found to be conflicting objectives: Aspects positively influencing the quality of agreements, simultaneously decrease the prospects of reaching an agreement at all (Pruitt, 1981). This well-known phenomenon called the negotiation dilemma has not yet been addressed adequately by existing systems. On the contrary, research on acceptance of post-settlement decision support, which would allow negotiators Pareto-efficient improvement of preliminary agreements, clearly show that the majority of negotiators prefer to adhere to a dominated outcome, which was reached by their own joint effort rather than to accept a solution offered to them by a system. They are therefore willing to sacrifice (own and/or the counterpart's) economic value for feeling better with an outcome (Gettinger et al., 2010). Also, experiences with *vienNA2.0,* a system that carries out the tasks usually assigned to a human mediator in face-to-face negotiations (i.e. monitoring of the progress of the negotiation, analysis of the causes of impasse, and advice to overcome impasses) show that behavioural support has not yet realized its assumed potential (Gettinger et al., 2011).

Currently implemented support methods crucially rely on the negotiators' recognition of (i) either the benefit of the offered support features, (ii) or the need for external help in due time. Furthermore, negotiators will only appreciate this type of support if they reflect on their own behavior and adapt that behavior according to the advice provided by the system. Both requirements are more likely fulfilled by experienced negotiators. In order to understand and exploit the utility of analytic decision support, users would have to understand the fundamental concepts of multi-attributive utility theory, as well as the concepts of decision and negotiation analysis. This sets relatively high cognitive demands on potential users. However, it is still the bounded rational human user who makes the decisions whether or not to use

the manifold functionalities of these systems (Bichler, 2000). Studies show for example that individuals behave inconsistent with their preferences even when utility values are displayed during the negotiation process, or that they reject to enter a post-settlement phase though this could improve their outcome (Gettinger et al., 2010). This shows that for human negotiators, Pareto-efficiency is certainly not the only and probably not even the most important aspect of a negotiation outcome. Given the cognitive limitations of human negotiators, they also might make errors in their usage of negotiation support systems or not fully exploit the possibilities they offer. Furthermore novices and layman might not have enough experience to realize the appropriate time to rely on expert systems' help or to evaluate the situation appropriately and thus do not realize the potential of analytical or behavioral decision support at all.

Therefore new avenues for negotiation support are needed, in which (individual) characteristics of potential users are better taken into account.

One avenue is to implement pro-active decision support systems (Kersten and Lai, 2008) which are capable of monitoring actual negotiation behavior and intervene into the process when necessary. So far, agent technology and artificial intelligence offers various approaches to support negotiators proactively or even allow them to delegate negotiation tasks. For ill-structured negotiations, full automation is not possible, but agents still can serve as intelligent assistants that inform their users' decision making and negotiation activities. In eAgora (Chen et al., 2005), for instance, an agent elicits the user's preferences, suggests possible offers, evaluates the user's and the opponent's offers during the negotiation and warns if the user plans to accept an inferior offer. Empirical tests of eAgora found out that the users not only accept the software agent's support, but also demand additional functions for the supporting agent and partial automation of the negotiation process (Chen et al., 2005). Other systems are developed to intervene in the process when concessions offered – based on utility measures - are either too big or too small given a pre-specified strategy by the negotiator. The advanced concession advisor tool (AC-AT) is currently implemented as an expert advice tool on demand but could be further advanced to a pro-active advice tool (Filzmoser and Vetschera, 2011).

In a similar vein, behavioral support could intervene pro-actively into the negotiation process, when negotiators are at risk to be trapped in stalemates or escalating conflict behavior. The challenge for pro-active behavioral support therefore lies in the analysis of communication and interaction, as well as the detection of the threats mentioned above, as early as possible. Recent attempts at developing machine learning algorithms to identify emotions in real-life interactions show promising results (Tausczik and Pennebaker, 2010). An avenue for further development of behavioral support tools lies therefore in the integration of process-monitoring machine-learning applications, which can identify escalating negotiation behavior or inflexibility.

This paper will provide a more detailed outlook on possible avenues for an upcoming generation of pro-active eNS – the 2.0^2 G eNerationS.

Acknowledgments. This research was partly funded by the Austrian Science Fund (FWF), project number P21062

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