Can Computers Negotiate? Win-Win Negotiations in a Virtual World

By Horacio Falcão, INSEAD Senior Affiliate Professor of Decision Sciences

Not only can they negotiate, they can also use win-win moves to help their human counterparts yield more value for both parties.

The game of chess and negotiations share many similarities. Two sides engage in a strategic dance towards their objectives. Back and forth, one player's move will affect the other's next move in an exciting tangle of calculation and strategy.

As technology has advanced, computers have been quickly learning how to play our own games. IBM's Deep Blue Computer beat the world's chess champion after a six-game match in 1997. However, different from chess, negotiations are more sophisticated games in which the more human elements of trust, emotions, subjectivity, language and collaboration have to be taken into account. So, few would have anticipated that just 15 years

after Deep Blue's victory, computers would have started to learn how to play a bigger role in the much more complex games of negotiations.

And yet, computers can now promote win-win strategies and even trust in online sales negotiations. In a **recent paper**, in collaboration with Yinping Yang of A*STAR, Nuno Delicado of Pluris and Andrew Ortony of Northwestern University, we found that trust can be built between humans and computers by adding a simple dynamic into the mix: taking the initiative of putting one priority on the table, explaining the motivation to do so and inviting the counterparty to do the same.

The rise of the machines

While face-to-face negotiations can normally be of benefit if the individuals involved trust each other, it is also important in online interactions. Through our experiments, we prove that by volunteering information that it need not disclose, a computer agent can alleviate mistrust in humans engaging with it.

We know that in human-to-human negotiations if a win-win negotiation move is adopted, such as proactively sharing interests, this can yield more value. There are many advantages to win-win strategies: long-term business relationships, efficient processes and more value in the outcomes for both sides. What is fascinating in our findings is that what works for human-to-human negotiations, also seems to work for computer-to-human negotiations. These findings have great and practical implications for companies using software in negotiations as well as in uncovering the potential for collaboration on research between human-to-human and computer-to-human.

Putting them to the test

We conducted a multi-issue negotiation where a computer agent was the seller and humans the buyer of laptop computers. The machine had four issues in its negotiation arsenal: price, quantity, service level and delivery terms. In one condition, the computer honestly revealed its number one priority: price. However, in this condition, even if the human counterparty revealed its preference back, the computer did nothing to maximise the preferences of the human counterpart. Interestingly, the perception among the participants was that it did.

There was a marked difference in the number of agreements when the computer was proactive in sharing its priority, with 22 out of 27 possible agreements, than when it was not (14 out of 27). Similar results were reflected in the satisfaction of the "buyers". The majority of participants also responded to the computer's invitation to share their priorities to align with its four issues.

Online and offline implications

What was even more interesting was that distrusting humans came on board with the machine once it put one of its cards on the table, shared its intention to collaborate and invited the counterparty to reciprocate. In this case, those of high "Machiavellian" personality types (more distrusting), reacted similarly to those with more trusting personalities during the negotiation. What this shows is that if you make the right moves and share information that can help both parties become better off throughout the negotiation, you can normalise even distrustful counterparts. This cuts the need of trying to profile your opponent before a negotiation.

One important thing to keep in mind, however, is that sharing a multi-layered wish list should be spread out in an exchange where you share some and learn some from the counterparty. Throwing all your cards onto the table at once in the beginning can be a dangerous pursuit in virtual or real-world negotiations. But the point remains: proactively initiating the sharing of an intention to collaborate and of our interests to build understanding of what value means for both sides can yield new avenues for value creation.

This experiment shows that more can come of a collaborative approach to negotiations and that sharing information rather than hitting the table with a power-position can be to everyone's benefit. Typically, those adopting power poses and nonchalance only create a mirror image of that behaviour in their counterpart. The opponent is more likely to be guarded in reaction to a combative stance.

The automated future

For companies building artificial intelligence (AI) negotiation tools, this is fascinating, because what works for human-to-human negotiations, also seems to work for computer-to-human ones. It confirms that even information disclosure works in both areas. Even the more subjective elements of negotiations such as trust and a statement of invitation to share

priorities can be transferred to computers in a successful way.

With business leaders increasingly moving to the cloud and the internet in a big way to automate deal making, there appears to be a future for AI-human negotiations that resembles the preferred styles of human-to-human agreements.

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