

Persuasive Negotiation Dialogues using Rhetorical Arguments (Doctoral Consortium)

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ABSTRACT

In persuasive negotiation dialogues, agents, with different interests and goals, exchange proposals that are supported by rhetorical arguments such as threats, rewards, or appeals. The aim of this thesis is to investigate such dialogue systems, where agents can generate rhetorical arguments in order to try to persuade their opponents, and can also construct counter-arguments, which depend on the type of the previously received argument. The main contributions of this work are (i) a persuasive negotiation model that supports this kind of dialogue and (ii) the study the notion of acceptability of these kinds of arguments according to the Dung's definitions.

Keywords

rhetorical arguments, persuasion, negotiation

1. INTRODUCTION

Persuasive negotiation involves negotiating using rhetorical arguments (such as threats, rewards, or appeals), which act as persuasive elements that aim to force or convince an opponent to accept a given proposal [5]. These kinds of arguments have been studied in terms of speech acts [5] and in other articles, a logical formalization has been given [1][2]. It was also studied how to evaluate their forces and how they can be defeated [2][4]. However, other kinds of illocutions can also be exchanged by agents during a persuasive negotiation dialogue. For instance, agents can ask for an explanations or can attack an argument. Therefore, it is important to consider, besides the rhetorical arguments, other types of illocutions since this will enrich the dialogue.

In this work, we study a dialogue system that contains the main rhetorical arguments and also other illocutions that let agents resolve their conflicts and reach a deal. We use classical logic for representing the beliefs and goals of agents, and we base on [2] for the logical representation of rhetorical arguments. We also define a set of possible attacks for each type of rhetorical argument and specify how their strengths

should be calculated in order to be able to determine the defeated arguments and the acceptable ones.

In this setting, we study how agreement can be reached and how rhetorical arguments and the other kinds of illocutions are related in an argumentation framework. We study how Dung's semantics can be used in this context in order to obtain a set of acceptable arguments.

2. MOTIVATING EXAMPLE

Imagine a scenario such as the following. Two agents, Maria (M) and Carlos (C), are discussing household chores. Maria is trying to persuade Carlos to do the cleaning of their apartment. The following dialogue shows how agreement is reached:

- (1) **M:** Carlos, could you please do the cleaning?
- (2) **C:** No, I can not, I have to work.
- (3) **M:** If you do the cleaning, I could help you with your reports and you can finish your work early.
- (4) **C:** You cannot help me.
- (5) **M:** Why?
- (6) **C:** Because these reports are about a topic you do not know.
- (7) **M:** Well, if you do not do the cleaning, I will not go to your mother's house on Saturday.
- (8) **C:** If you will not go to my mother's house, I will not talk to her about the work for your brother.
- (9) **M:** That is not longer necessary, my brother got a job yesterday.
- (10) **C:** Well, if you do not go, you will miss the opportunity to meet my sister. You both are very close and she only comes every two years.
- (11) **M:** I have already talked to her and we are going to go out next week. So, are you going to do the cleaning or not?
- (12) **C:** OK. You win!

In this example, Maria succeeds in persuading her husband Carlos to do the cleaning of their apartment. On the first try to persuade Carlos, Maria uses a reward (line 3), which is not accepted and an attack to her reward can be seen (line 4). Since her reward was not successful, she uses a more powerful argument, she threatens Carlos (line 7), and he answers also with another threat (line 8), we can call it a counter-threat. She answers attacking Carlos' counter-threat (line 9). Carlos also tries to appeal to her friendship

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with his sister (line 10), but once again he fails (line 11), therefore he accepts to do the cleaning.

Notice that an explanation is required during the conversation (line 5), hence agents can make questions each other and can use explanatory arguments to justify their opinions. Figure 1 shows the outline of the dialogue in terms of rhetorical arguments, attacks and other illocutions, and Figure 2 illustrates the attacks between some of the arguments. Notice that threats (and the other rhetorical arguments) are mainly composed of the goals of the proponent and opponent. However, opponent modelling is out of the scope of this thesis. We assume that agents have, in advance, the necessary information (for instance, opponent's goals and their importance for the opponent) for generating rhetorical arguments and calculating their strength.

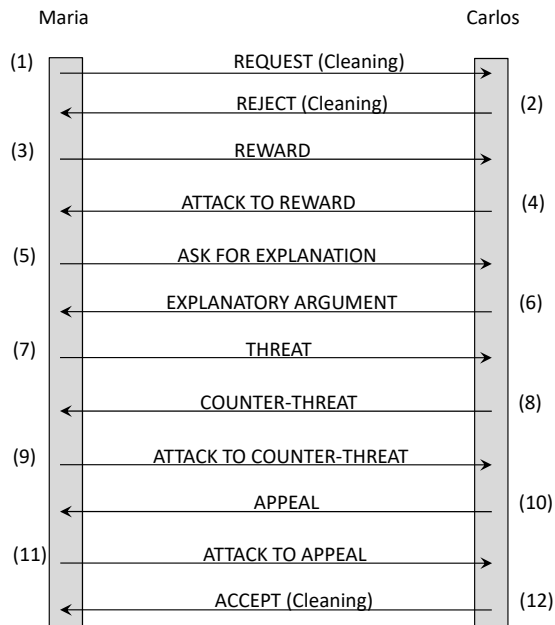


Figure 1: Outline of the dialogue between Maria and Carlos, which ends successfully for Maria.

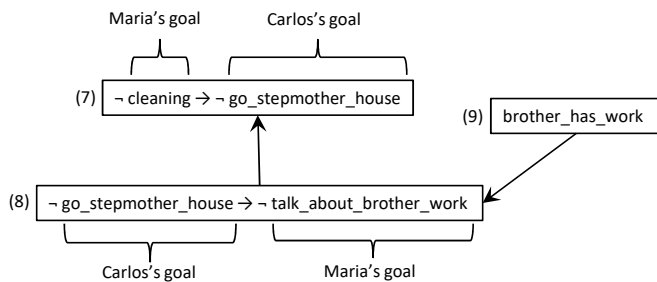


Figure 2: In (7) Maria threatens one of the goals of Carlos: *go_stepmother_house* and in (8) he threatens one the goals of Maria: *talk_about_brother_work*. Carlos uses a counter-threat (8) to attack the threat of Maria (7), and she uses a fact to attack the counter-threat of Carlos (9).

3. PROGRESS TO DATE

We have done the analysis of threats, rewards and appeals in order to determine the possible attacks each can receive and the attacks that could exist among them. This analysis has also allowed us to define different and customized formulas for calculating the strength of each kind of rhetorical argument[3][4].

With respect to the dialogue, we have defined a set of legal moves each agent can make. These include making requests, accepting or rejecting requests, presenting arguments, making threats, rewards or appeals, attacking rhetorical arguments or explanatory ones. A protocol that guides agent during the dialogue was also proposed.

4. CONCLUSION AND FUTURE WORK

In this thesis, we investigate persuasive negotiation dialogues and the use of rhetorical arguments in this context. We aim to contribute by proposing a persuasive negotiation model and to the study of acceptability of arguments taking into account these kinds of arguments and other illocutions uttered by the agents during the conversation.

We will continue with the evaluation of the formulas proposed for the calculation of the strength of threats, rewards and appeals. This evaluation phase will include the definition of evaluation tools, experiments scenarios and results analysis. We also will complete the persuasive negotiation model and study the relation among all the possible illocutions uttered during the dialogue.

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