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Gorgias-B: Argumentation in Practice

Nikolaos I. SPANOUDAKIS [a,1], Antonis C. KAKAS [b] and Pavlos MORAITIS [c]
[a] *Applied Mathematics and Computers Lab., Technical University of Crete, Greece*
[b] *Department of Computer Science, University of Cyprus, Cyprus*
[c] *Laboratory of Informatics Paris Descartes (LIPADE), France*

Abstract. *Gorgias-B* is a new tool that supports a methodology for the development of real life applications. It can be used by non-argumentation experts generating and testing automatically the target argumentation theory in *Gorgias*.

1. Gorgias-B: Supporting applications of preference-based argumentation

Argumentation technology is well suited for implementing decision making mechanisms under conflicting, incomplete and contextual knowledge. It allows choosing preferred options (e.g. actions) among a list of possible (usually conflicting) alternatives under some decision policy of an application. *Gorgias* is a system based on preference-based argumentation that has been used during the past ten years by different users for developing a variety of real life applications (see http://www.amcl.tuc.gr/gorgiasb/Apps.html). Based on the study of these applications we have developed a new tool, *Gorgias-B*, to support the development of applications of argumentation under *Gorgias*, following a general software methodology. *Gorgias-B* guides the developer to structure his/her knowledge at several levels. The first level serves for enumerating the possible decisions and arguments that can support these options under some conditions, while each higher level serves for resolving conflicts at the previous level by taking into account default or contextual knowledge.

Figure 1 illustrates the development of a seller agent using the *Gorgias-B* tool. In the first screen (bottom) the user has defined two conflicting options, i.e. to sell products to agents at a high price or to sell them at a low price. Options appear on the left and then defined as complementary (or conflicting) on the right. After defining the various options the user can press the button "*Add arguments for options*" opening the dialogue in the next screen (second from bottom-up in the figure). This shows two arguments, a default one for selling high and another for selling low (*when* the buyer agent accepts to pay cash). By following the button "*Resolve conflicts*" a new dialogue (third from bottom-up in the figure) appears. Here, we can select possible scenarios (produced by combining the contexts of the arguments with conflicting options) of the previous level and select the winning option in the specific scenario. In the specific screen, "sell high" is preferred as a default policy for the seller. However, in the case of a regular costumer, selling low is preferred over selling high. In this more specific context, i.e. of *[pay cash, regular customer]*, we still have a conflict as both options can be selected. In the fourth

[1]Corresponding Author: Nikolaos I. Spanoudakis, Technical University of Crete Campus, 73100, Chania, Greece; E-mail: nikos@amcl.tuc.gr.

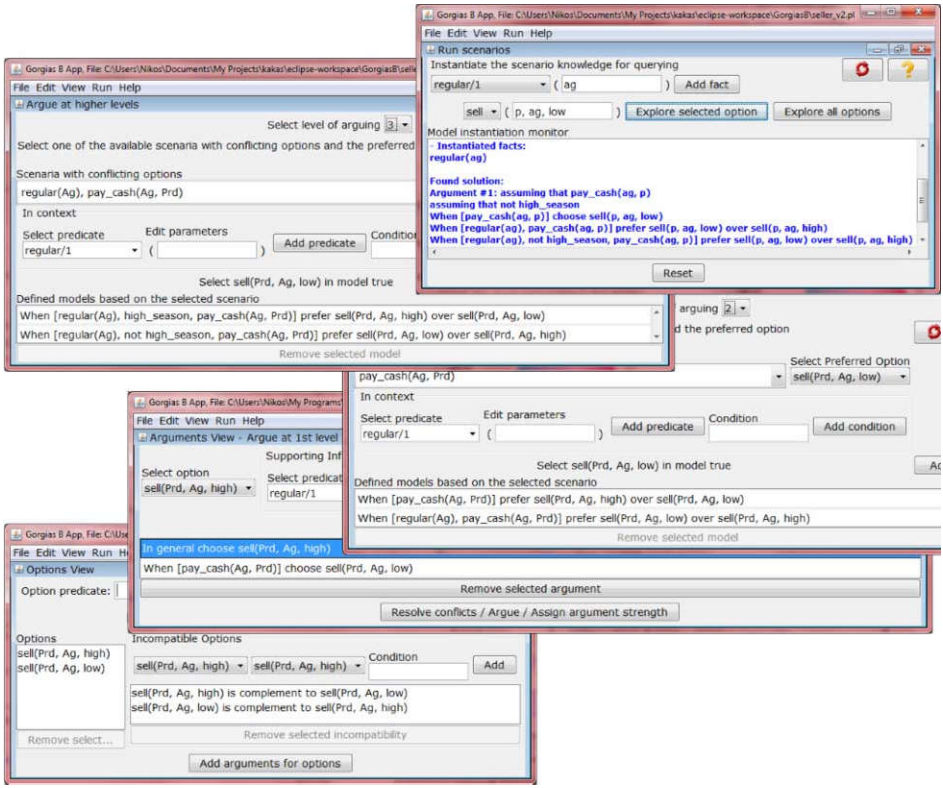

Figure 1. Gorgias-B screenshots

screenshot we see that we can resolve this conflict at a next level prefering the option low when it is not high season and high otherwise. Due to the complementarity of these two refinements of the context there is no need for further resolution at a next level (no scenarios appear if the user selects that level).

During this process the tool generates automatically an argumentation theory that captures the high-level specification entered by the developer within the argumentation framework of *Gorgias* [1]. This theory can be executed through the *Gorgias-B* tool (see last screen from bottom-up) by specifying scenarios of interest and asking which options are credulously or sceptically entailed in the scenarios. The tool returns these together with the admissible arguments that support them. *Gorgias-B* allows also to specify some predicates as *abducible*, and the tool can find scenario conditions under which an option or a conclusion will be entailed. In the last screenshot, we see that to support a low selling scenario, the assumptions of payment in cash and that it is not high season must hold.

Gorgias-B is freely available from http://gorgiasb.tuc.gr. Apart from application development it can also be used to demonstrate argumentation and how it supports defeasible reasoning.

References

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