GRAFIX: a Tool for Abstract Argumentation

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Abstract. GRAFIX is a graphical tool for handling abstract argumentation graphs. GRAFIX allows the edition and the presentation of argumentation graphs (or sets of graphs), and the execution of some "predefined treatments" (called "server treatments") on the current graph(s) such as, for instance, computing various acceptability semantics, or computing the strength of arguments. GRAFIX also allows the user to introduce her own treatments ("client treatments").

Keywords. Implementation of argumentation systems; Tool for supporting argumentation; Abstract argumentation graphs.

The abstract argumentation framework described by Dung [1] proposes a formalization of abstract argumentation systems under the form of a pair $\langle \mathscr{A}, \mathscr{R} \rangle$ ($\mathscr{A}$ being the set of arguments, and $\mathscr{R}$ being the set of attacks over $\mathscr{A}$). Several extensions of this framework have been defined, in order, for instance, to account for new types of interaction [2,3,4], or valuations over arguments [5] or over interactions [6].
GRAFIX is a graphical tool for handling such abstract argumentation systems, that can be represented by weighted directed graphs whose vertices are arguments and edges represent binary interactions between arguments. Let *a* and *b* be two arguments, three kinds of interaction can be taken into account: Attack $\mathscr{R}_{\text{att}}$ ("$a\ \mathscr{R}_{\text{att}}\ b$" means that there is a kind of conflict between *a* and *b*); Support $\mathscr{R}_{\text{sup}}$ ("$a\ \mathscr{R}_{\text{sup}}\ b$" means that *a* supports/helps *b*); Ignorance $\mathscr{R}_{\text{ign}}$ ("$a\ \mathscr{R}_{\text{ign}}\ b$" means that the precise nature of the interaction between *a* and *b* is unknown). So GRAFIX can handle "classical abstract argumentation graphs" (denoted by AF, with only $\mathscr{R}_{\text{att}}$), "abstract bipolar argumentation graphs" (denoted by BAF, with $\mathscr{R}_{\text{att}}$ and $\mathscr{R}_{\text{sup}}$), "abstract partial argumentation graphs" (denoted by PAF, with the three kinds of interaction), and also "sets of AF (resp. BAF, PAF)". Moreover, arguments and/or interactions can be weighted. GRAFIX has a double aim:

1. The definition and the visualization of abstract argumentation graphs. These graphs can be defined graphically, loaded from or saved into text files (with a specific format).
2. The execution of "treatments" on the current graph (or set of graphs). There exist two kinds of treatments:
   - "server (*i.e.* predefined) treatments" are already integrated in the tool; GRAFIX computes the extensions for the well-known acceptability semantics (grounded, preferred, stable, see [1]), for some extended variants of these semantics (see [7,8]); GRAFIX also handles weighted graphs as described in [5,9,10,11] and implements merging mechanisms (see [12,13]);
   - "client (*i.e.* customized) treatments" are written by the user and *executed inside* GRAFIX; data associated with these treatments are exchanged with GRAFIX through text files containing the graphs (the user's program should understand the input text format from GRAFIX, and the result of the execution should be understood by GRAFIX). For instance, assume the user has made a C program for

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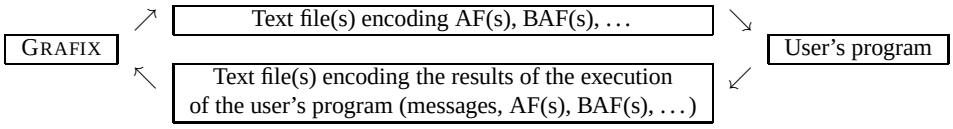
computing a new semantics. This treatment can be added to GRAFIX by a simple "click", and then executed on the current argumentation graph by another click.



Two versions of GRAFIX exist (either a JAVA applet or a JAVA archive) and are accessible from the corresponding author's website [14].
GRAFIX is suitable for rapid prototyping as ASPARTIX [15], but it also allows a graphical, and so a more intuitive, definition of argumentation graphs; moreover, with GRAFIX the user can easily introduce her own treatment and directly test it. Another powerful tool, ConArg [16] can be compared with GRAFIX. However, ConArg considers only one kind of interaction (attack) and the computation of different semantics whereas GRAFIX proposes a larger panel of interactions and treatments.
Future works will concern the realization of (1) a module for exchanging with the users that want to integrate their client treatments as server treatments, (2) the definition of benchmarks and (3) the possibility to use ASPARTIX file format.

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