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A Benchmark Framework for a Computational Argumentation Competition

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Abstract. We introduce probo, a general benchmark framework for comparing
abstract argumentation solvers.

Keywords. Argumentation, argumentation semantics, argumentation competition

1. Introduction

Computational models of argumentation are nowadays an active research discipline
within Artificial Intelligence that has grown since beginning of the 90s [1]. Although
the community is still quite young, compared to more matured research areas such as
SAT solving and Logic Programming, there has been serious interest in its development
due to its intuitive approach and similarities to human reasoning. However, research in
Computational models of argumentation is still mostly theoretical in nature and is con-
cerned with aspects such as abstract argumentation, semantics, structured argumenta-
tion, and dialogues, to name just a few. There are, however, already several existing
domain-independent implementations such as ASPARTIX, CEGARTIX, ConArg, Dung-
O-Matic, and Tweety, but so far there has been no organized and thorough comparison
of different solvers, see [2] for some exception. Other research communities such as
SAT solving, Logic Programming, and Planning showed that conducting competitions
on problem solvers nurtures research and rapid development of effective algorithms and
implementations. These competitions serve as a comparison platform for state-of-the-art
research and have been proven to accelerate the evolution of a field from theoretical dis-
cussions to the development of applicable solutions. We argue that the time has come for
a first competition on computational models of argumentation.

In this extended abstract we present probo (lat. "judge"), a general benchmark
framework for comparing abstract argumentation solvers. This benchmark framework
has been developed to serve as the comparison platform for a competition on compu-

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tational models of argumentation which is currently being organized and scheduled for the year 2015. The aim of this framework is to easily compare different implementations for solving argumentation problems in terms of *correctness* and *performance*. The framework provides a very general interface (command line and Java) that can be implemented by a solver in order to be assessed by the framework. Currently, our framework focuses on abstract argumentation but extensions to structured argumentation frameworks is foreseen for the future.

2. Implementation Overview

probo is written in Java and publicly available at SourceForge[2]. It provides a simple interface that can be implemented by developers of abstract argumentation solvers and supports comparison of solvers on a variety of semantics (conflict-free, admissible, complete, preferred, stable, semi-stable, grounded, CF2, ideal, stage), different computational problems (e. g., enumerating extensions, deciding skeptical/credulous inference), and different file formats (e. g. trivial graph format, Aspartix). Solvers are asked to solve problems on different argumentation graphs that have been either artificially generated using different randomization models, generated from other more general problems (e. g. graphs that represent the factorization problem), or application-oriented problem instances. Correctness of solutions is verified by the Tweety solver [4], which directly implements the semantical definitions of the different types of extensions but is slow in practice.

3. Discussion

We see our field as a promising field within Artificial Intelligence and believe that it is high time to go beyond theoretical discussions and into implementations and applications. With our contribution and the idea of a competition on computational argumentation we aim at providing a common platform for comparing and evaluating practical approaches within the field.

The benchmark framework probo is still under development but we aim at organizing a first competition on computational models of argumentation for the year 2015. A description of the current command line interface used by probo can already been found in our repository. We invite developers of abstract argumentation solvers to comment on the framework and to get ready for the first competition.

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