

Computational Models of Argument: A Fresh View on Old AI Problems

Gerhard Brewka

Department of Computer Science, Leipzig University, Germany
`brewka@informatik.uni-leipzig.de`

Abstract. In the last two decades symbolic AI has seen a steady rise of interest in the notion of argument, an old topic of study in philosophy. This interest was fueled by a certain dissatisfaction with existing approaches in knowledge representation, especially default reasoning and inconsistency handling, and by the demands of applications in legal reasoning and related fields. The ultimate goal of computational argumentation is to enable the development of computer-based systems capable to support and to participate in argumentative activities. To this end one has to come up with formal models of the way we usually come to conclusions and make decisions, namely by

1. constructing arguments for and against various options,
2. establishing relationships among the arguments, most notably the attack relation, and
3. identifying interesting subsets of the arguments which represent coherent positions based on these relations.

In the talk we will highlight some of the main ideas and key techniques that have been developed in the field and show how they provide new ways of representing knowledge, handling inconsistencies, and reasoning by default. In particular, we will demonstrate how directed graphs with arbitrary edge labels, which are widely used to visualize argumentation and reasoning scenarios, can be turned into full-fledged knowledge representation formalisms with a whole range of precisely defined semantics.