Logical Limits of Dung's Abstract Argumentation Framework

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A Dung's abstract argumentation framework takes as input a set of arguments and a binary relation encoding attacks between these arguments, and returns arguments gathered in some so-called extensions. General indications lack on how to instantiate this setting from a logical formalism: I.e., how to build argumentsfrom a given *logical* knowledge base and how to choose an appropriate attack relation. This leads in some cases to undesirable results like inconsistent extensions (i.e., the set of logical formulas underlying an extension is inconsistent). This is due to the gap between the abstract setting and the knowledge base from which it is specified.

We first propose to fill in this gap by extending Dung's framework. The idea is to consider all the ingredients involved in an argumentation problem. We start with the notion of an abstract monotonic logic which consists of a language (defining the formulas) and a consequence operator. We show how to build, in a systematic way, arguments from a knowledge base formalised in such a logic.

When starting from a logical knowledge base, this takes care of defining *the* arguments. As evidenced by the literature, it often happens that people take a *syntax-based* subset of the arguments and a specific attack relation to form an argumentation framework that they claim to capture the argumentative information represented in the logical knowledge base. We show that such need not be the case, in particular with the mostly overrated undercut relation.