(This is part of a symposium on *Argument Strength*)

The Computational Approach to Argument Strength

A commonality among the wide variety of independent (but often overlapping) techniques for approaching argumentation strength computationally is the broad demotion of historical, socio-psychological, and linguistic aspects of argumentation, replacing these with a strong focus on abstraction. Though the ensuing divergence from real world practices has (perceived) negative consequences with respect to applicability, a key advantage is to provide machines with reasoning methods that are roughly similar to those of humans.

Ignoring its linguistic content, we can treat an argument as a network-node, related to other nodes through a variety of formally describable relations. Computers can efficiently analyse such networks, avoiding many of the problems associated with understanding and manipulating natural language. This approach to 'abstract argumentation' (Dung, 1995) often concerns itself narrowly with the *attack relation*, sometimes to the complete exclusion of other important concepts such as *argumentative support*. Recent recognition of this shortcoming has led to renewed focus on so-called *structured argumentation*. An example is ASPIC+ (Modgil, 2014), a leading structured argumentation model that recognises the role of support as important.

Interestingly, the concept of an argument's strength—by extension, the idea that other arguments are comparatively as strong, stronger, or weaker—is relatively rare in this domain. Instead, we find a marked preference for content that can be logically, justifiably, or defeasibly accepted, here assuming some definition of the semantics of acceptability. In many approaches, indeed, the closest we come to a proper notion of argument strength today is through using orderings (e.g., based upon preferences, a measure of probability, or temporal precedence, amongst others).

The broad absence of social and psychological concepts from computational approaches has often left the latter at a strategic disadvantage. In fact, the very concept of argument strength can become fuzzy once multiple reasoners are involved. After all, what one reasoner considers the strongest argument need not be so strong to another reasoner.

This contribution maintains a broad focus upon the extant range of abstract computational approaches. We survey the variety of ways in which argument strength has (not) been characterised, and suggest directions for extending computational approaches to bridge (real and perceived) gaps between computational and philosophical practises of argumentation.

In line with other presentations in this panel (covering dialectical, structural, probabilistic, and empirical approaches), we represent and discuss a pre-agreed case comprising a brief episode of dissenting argumentative exchange, to compare how each approach applies to it. The panel's main purpose is to provide a comprehensive and comparative overview of extant approaches to argument strength, inquiring into the possibility of theoretical unification.

Phan Minh Dung (1995) On the acceptability of arguments and its fundamental role in non-monotonic reasoning and logic programming and n-person games. Artificial Intelligence, 77:321–357, 1995.

Sanjay Modgil & Henry Prakken (2014) The ASPIC+ framework for structured argumentation: a tutorial, Argument & Computation, 5:1, 31-62, DOI: 10.1080/19462166.2013.869766