Conventional Implicatures in Computational Argumentation

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Abstract. In this paper we argue for incorporating a class of meaning in computational argumentation that has not been previously exploited in the area, namely conventional implicatures (CIs). Due to their representation on the linguistic surface, they are easier to exploit for computational purposes than the better-known conversational implicatures. By incorporating CIs in Inference Anchoring Theory, we equip a framework for handling dialogical argumentation with the means to expose a particular type of enthymematic structure, making it amenable for computational argumentation.

Keywords. conventional implicatures, implicit argumentation, enthymematic structures, Inference Anchoring Theory

One challenge of automatically processing argumentation in real, naturally occurring communication is that it is often implicit, with speakers expecting arguments to be decoded by the hearer without necessarily asserting all relevant information. In this contribution, we go beyond the level of analysis previously sought for in computational models of natural language argumentation and capitalise on recent work in semantics: in addition to analysing arguments that are explicitly given by way of asserted content, we exploit the notion of *conventional implicatures* [1,2,3,4], a class of meaning that, among other functions, unpacks a subset of enthymematic structures in the argument network, thus yielding more accurate argument analytics [5,6].

Implicatures (and for that matter, presuppositions) are themselves not new to argumentation theory: in particular, *conversational* implicatures [1] have been taken into account [7,8,9], however, due to the fact that they are not explicitly encoded on the linguistic surface and ultimately depend on world knowledge and common sense, they cannot be easily computed. *Conventional* implicatures (CIs), on the other hand, differ: they are triggered by particular lexical items and are context-independent, a substantial advantage for dealing with them computationally. CIs are also different to presuppositions [4, p. 33]: presuppositions can be cancelled under specific syntactic conditions, which CIs cannot.

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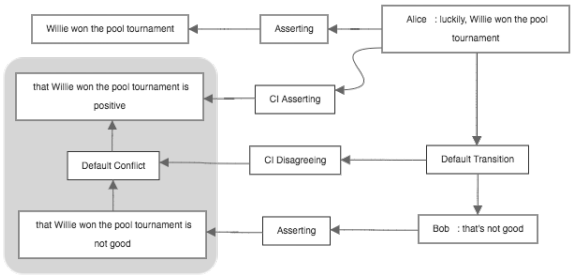

Figure 1. IAT^{CI} diagram for Example (1) with conventional implicatures

Example (1) showcases how we combine CIs and argumentation by extending (1a) of [4, p. 139] with the dialogical response in (1b). In (1a), Alice uses the adverb 'luckily' to conventionally implicate that Willie winning the pool tournament is positive. Bob, in (1b), attacks this aspect of (1a): not that Willie won the pool tournament (the at-issue content), but that him winning is positive.[3]

(1) a. [Alice:] *Luckily*, Willie won the pool tournament.
b. [Bob:] That's not good, though.

In order to analyse these types of enthymematic structures, we incorporate CIs in Inference Anchoring Theory (IAT^{CI}) [10], a theoretical scaffolding to handle *dialogue and argument structures, and the relations between them*. Figure 1 shows the IAT^{CI} diagram for example (1): The dialogical structure and their sequential ordering (Default Transition) are on the right-hand side, whereas the logical structure, i.e. propositions and the relations between them, are on the left-hand side. The logical structure is "anchored" in dialogical structure via illocutionary connections [11]: In the first move, Alice asserts that Willie won the pool tournament, in the second move Bob asserts that Willie winning the pool tournament is not good. The enthymematic structure is exposed by unpacking the contribution of 'luckily': In (1a), Alice implicates (CI Asserting) that Willie winning the pool tournament is positive. This proposition is attacked (Default Conflict) by the proposition of (1b). The attack is anchored in the transition via 'CI Disagreeing', capturing that the disagreeing can only be recognized by considering (1a). The whole implicit structure triggered by the CI is highlighted in grey in Figure 1.

In sum, CIs equip computational models of argumentation with an empirically-motivated means to process enthymematic structures in natural language argumentation. Having support for CIs in IAT – and thus the Argument Interchange Framework [12,13] and the Argument Web [14] – comes with the advantages of being able to compute argument strength [5] and other argument analytics [6], training mining algorithms [15,16], and so forth. Therefore, by capitalising on work in semantics, we are able to enhance computational argumentation with a layer of information that allows to track and expose implicit structures.

[3] A presupposition would be that there is someone uniquely identifiable to speaker and hearer as 'Willie', another that Willie took part in the pool tournament. A conversational implicature could be made by a focus on the noun phrase 'pool tournament', meaning that Willie did not win any other tournament except for the pool tournament. In any real discourse there will be a large number of presuppositions, most of which will be potentially irrelevant to the argumentation structure. Conversational implicatures are closer to conventional ones in terms of their relevance for argument analysis, but their dependence on context and the subtle or absent linguistic surface presence make them extremely hard to expose automatically.

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