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Comment

Compositionality, language and intention

Commentary on “Embodied language, best fit analysis, and formal compositionality” by J. Feldman

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Feldman’s article [2] describes a model of language understanding that attempts an extremely ambitious goal, to characterize the entire understanding process from syntax and semantics to contextual and discourse interpretation in a single framework that is cognitively plausible. Most notably, the model provides a specific proposal on how language connects to embodied mental states, and contains many good insights.

I find it a shame that the paper is cast in terms of an alternative to formal compositional models. As Feldman himself note, compositionality means different things to different people. Some readings, such as strong compositionality, are clearly wrong, while other readings are trivially true. This is unfortunate for several reasons: First, as acknowledged by linguists and philosophers working on compositionality within logical frameworks, they are only trying to solve part of the problem. Feldman might have argued that such an enterprise is not possible – that one can’t separate out the contextual interpretation for the compositional construction of meaning, but this is not done. Second, once the obviously wrong version of compositionality is eliminated, there are many still useful forms of compositionality that have been studied and provide useful theories. The claim that the word “red” differs in meaning depending on what it modifies isn’t a problem in any but the most naïve compositional models. There is a perfectly good compositional account of this behavior that treats *red* as a predicate modifier that creates a new predicate given the predicate it modifies (be it hair, a face or wine). Similarly, the Mandarin example with optional omitted arguments would be handled compositionally without problem by a fairly common treatment of having different predicates for each arity of verbal forms. Third, it is not clear that the construction grammar that he proposes could not be viewed as a “context independent” compositional model that produces the alternate hypotheses that then are considered by the best-fit scoring process. And in that, its not significantly different in nature than many approaches in the computational literature, notably unification grammars.

It may be that because I look at language comprehension in computational terms [1] that I find the contrast with the formal linguistic theories unsatisfying. A common approach in the computational literature is to use unification-style grammars that compositionally produce surface-oriented logical forms that are then processed by contextual processing. I think comparison with current computational models would have been much more illuminating. There is significant interest these days in developing logical forms that substantially follow the lexical and syntactic form of the sentence (e.g., [3–5]) and then casting the remainder of the understanding process as disambiguation and

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computation of entailments. Some of these models use techniques that are quite similar to the best-fit analysis, namely they optimize the likelihood of the interpretations using formalisms such as weighted abduction, Markov Logic and graphical models. It would be very informative to understand the differences between Feldman's approach and these computational models.

The article attempts to account for an impressive breadth of issues within a single mechanism, from parsing to underlying cognitive models and discourse processing. The mechanism that makes brings all these together is the best-fit analysis, which provides a uniform framework for comparing options and at first glance, provides an intuitively satisfying account. We see that their measure combines notions of syntactic preferences (computed over a corpus of sentences to see what structures are most common), semantic preferences such as what types of objects are likely to fill certain roles in frames, which help in assigning explicitly mentioned objects to roles and identifying missing roles in the situational context. But there is little detail here, and it seems that there are key factors that are missing. High on the list would be discussion of an intentional analysis of sentences. A critical factor driving the "you give auntie" example is the fact that the sentence is interpreted as a command – it is an action that hearer should do in the current context. Hence the peach is particularly salient as the theme. But if we change the underlying intention, say now we are talking about a charity auction yesterday where people volunteered relatives for auction, then *you give auntie* would have a very different interpretation, even if we are still sitting with a peach between us! I believe any adequate best-fit analysis process must be specified in terms of identifying the plausible intentions underlying the utterance, and cannot be captured by solely by knowledge about common syntactic patterns and semantic structures over the language, and the current physical situation. Likewise, identifying the correct reference of a pronoun or description will heavily depend on what the hearer perceives to be the intention of the speaker. This does not contradict the model described here, but in my view is a major missing part to a truly comprehensive solution.

To summarize, I find this a fascinating article with many insights. While I have focused mostly on some criticisms, I commend the author on his insights into cognitively plausible mechanisms for full language understanding and view this as taking some important first steps towards a comprehensive account.

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