The TRIPS Logical Form

The logical form language is an encoding of the semantic content of a sentence or text that can be mapped to a traditional knowledge representation only after contextual interpretation. It is roughly equivalent to a modal logic with underspecified scoping relationships. In addition, it is a "flat" representation, without the nested expressions one would see in a logic. The connection between the expressions is captured by the logical form variables, which serve as the links between different aspects of the formula.

In a typical application, the LF might pass through reference resolution to identify the intended referents of referring expressions, undergo some scope disambiguation to identify the intended order or quantifiers and operators. See Allen (1995) for an early discussion of our approach to logical form, and Manshadi et al. (2008) for an exploration of the LF as a underspecified constraint-based representation.

Another consideration is the support for robust parsing and interpretation. The LF is designed so that the correct representation of fragments extracted from an utterance will be identical in form to the same phrases if we had produced a full parse. The key technique that enables this is the use of a "flat" unscoped representations.

The word senses and semantic relations used in the logical form are specified by the TRIPS ontology. We have a browser for the LF ontology here.

The logical form of a sentence consists of a set of terms describing objects and relationships evoked by the utterance. One key term is speech act that was performed. For example, the term for the first noun phrase in logical form of

The man wants to eat it

is the term (THE m1 (:* ONT::MALE-PERSON W::MAN)). This expression shows most of the core elements that create a term. The first symbol, THE, is the **specifier**, and indicate that the NP is a definite reference. This information is critical for subsequent discourse processing and reference resolution. The second symbol, m1, is the **identifier**. This is a unique name that stands for this term. It will be used in other terms in the logical form (e.g., to indicate that m1 fills the EXPERIENCER role of the verb *want*, as well as acting as the discourse entity created in the discourse history and used for various purposes, especially in maintaining coreference chains. The third entity is the **ontology type** for the object. The types in the logical form maintain both the most specific class in the TRIPS ontology that describes the concept (i.e., *ONT::MALE-PERSON)* and also retains the stemmed lexical entry (i.e., W::MAN).

The remainder of a logical form term is a list of argument-value pairs that provide the links from the current term to other terms in the logical form. For example, the term for the event of wanting is

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(F w1 (:* ONT::WANT W::WANT)
      :EXPERIENCER m1 :FORMAL e1
      :TENSE W::PRES))
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This term involves the specifier "F", which indicates a propositional terms (i.e., defining a want event), the identifier as before, and the type (:* ONT::WANT W::WANT), and then a set of argument-value pairs including: