Syntax-Driven Semantic Frame Composition in Lexicalized Tree Adjoining Grammars

Laura Kalimeyer and Rainer Osswald
Heinrich-Heine-Universität Düsseldorf / Institute of Linguistics and Information Science

Project goals

- Development of a grammar engineering framework that integrates lexical and constructional semantics and allows a fine-grained factorization into syntactic and semantic components.
- Method: Combination of Lexical Tree Adjoining Grammar (LTAG) and decompositional frame semantics.

LTAG and grammatical factorization

Overview

Lexical Tree Adjoining Grammar (LTAG) (Joshi & Schabes 1997)

- Tree rewriting system (TAG) on elementary trees with two operations: substitution and adjunction.

Example: Simple TAG derivation by substitution and adjunction

Elementary trees are lexically anchored and can be arbitrarily large (extended domain of locality).

Elementary trees can be split into lexical anchors and unanchored trees, which are organized in tree families that represent subcategorization frames.

Example: Unanchored tree family for transitive verbs

Metagramm (Candido 1999, Crabbe & Duchier 2005)

- Constraint-based, factorized description of unanchored elementary trees.

Example

Decompositional frame semantics

- Concept centered with inherent structural properties (vs. event logic).
- Much more flexible than traditional decompositional templates.

Example: Decompositional representations of causative break

Cases study: the English dative alternation

(1) a. John sent Mary the book.
   (double object, DO)
b. John sent the book to Mary.
   (prepositional object, PO)

Traditional decompositional analysis:

(2) a. [ X ACT | CAUSE | HAVE ]
   (caused possession)
b. [ X ACT | CAUSE | GO TO ]
   (caused motion)

Observation (inter alia, Krikova 2004, Rappaport Hovav & Levin 2008):

- The interpretations of the DO and the PO constructions are sensitive to the lexical semantics of the verb.

Partial semantic classification of alternating verbs (cf. Beavers 2011)

Sketch of lexical and constructional frames

Illustration of metagrammatical factorization

Examples of lexical anchoring

- Process of anchoring the PO construction by throws:

- Result of anchoring the DO construction by sends:

Ongoing and future work

- Systematic definition of syntactic classes and generation of tree families.
- Larger coverage of constructions and more detailed semantic frames.
- Implementation by means of the XMG und TuLIPa tools.