ARRAY TFS STORAGE FOR UNIFICATION GRAMMARS


Constraint-based grammar formalisms such as Head-Driven Phrase Structure Grammar (HPSG) model linguistic entities as sets of attribute-value tuples headed by types drawn from a connected multiple-inheritance hierarchy. These typed feature structures (TFSes) describe directed graphs, allowing for the application of graph-theoretic analyses. In particular, graph unification—the computation of the most general structure that is consistent with a set of argument graphs (if such a structure exists)—can be interpreted as expressing the satisfiability and combination functions for the represented linguistic entities, thus providing a principled method for describing syntactic elaboration. In competent natural language grammars, however, the graphs are typically large and numerous, and computational efficiency is a key engineering concern. This thesis describes a method for the storage of typed feature structures where each TFS comprises a self-contained, contiguous memory allocation with a tabular internal structure. Also detailed is an efficient unification algorithm for this storage mode. The techniques are evaluated in agree, a new managed-execution concurrent unification chart parser which supports both syntactic analysis (parsing) and surface realization (generation) within the framework of the DELPH-IN (Deep Linguistic Processing with HPSG Initiative) joint reference formalism.

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