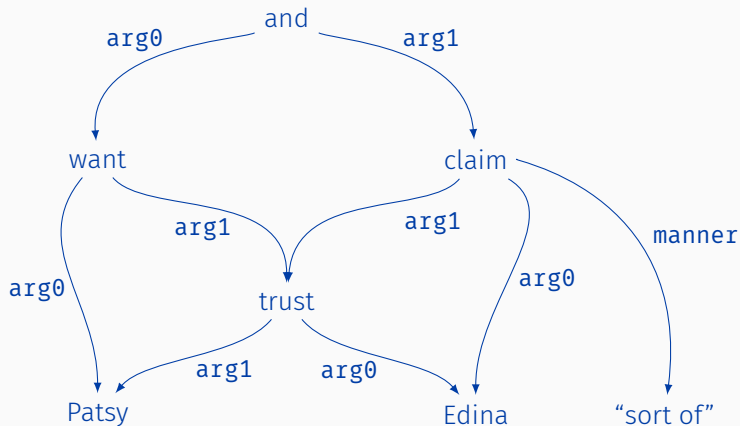


TREE-TO-GRAPH TRANSDUCTIONS

Johanna Björklund

Highlights 2017

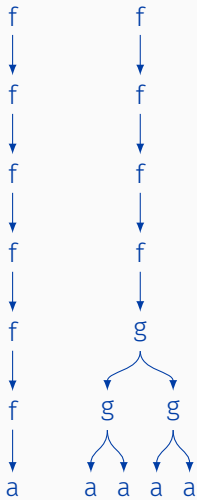
Dept. Computing Science, Umeå University

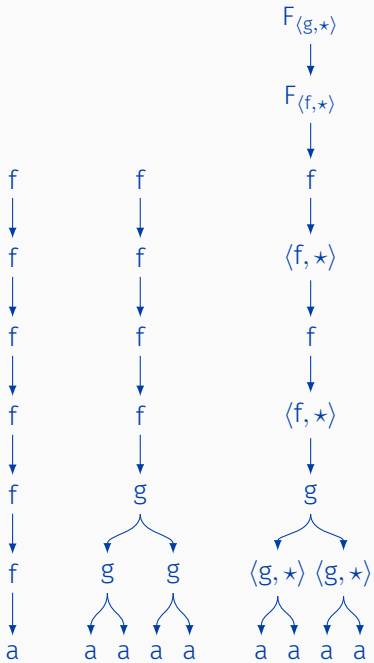


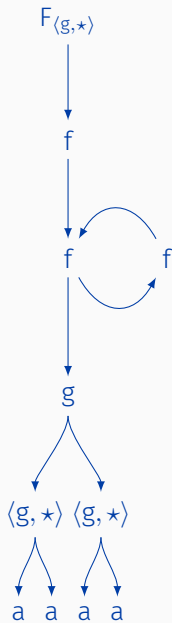
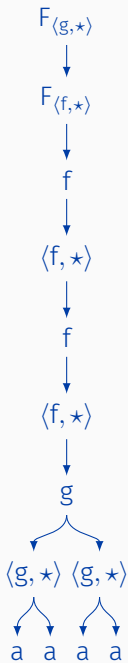
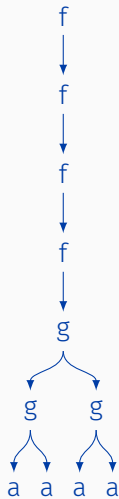
Generate AMRs through the combination of

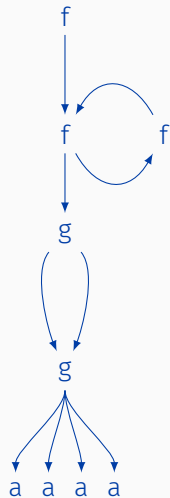
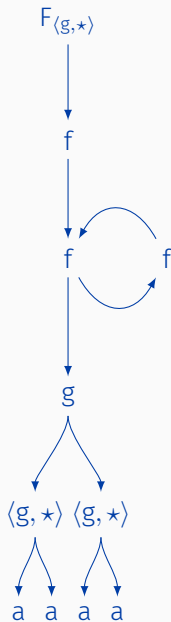
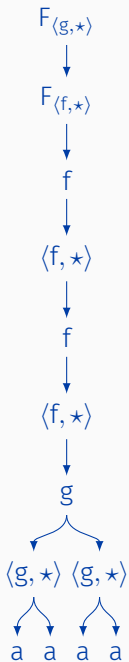
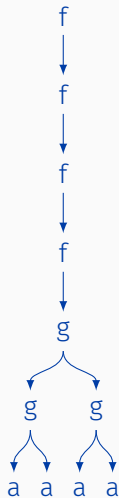
- a regular tree grammar,
- a sequence of linear top-down tree transducers, and
- a folding function that merges selected nodes.

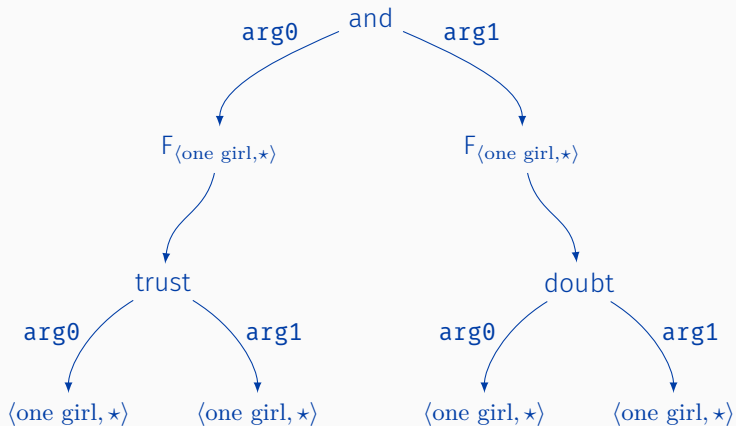
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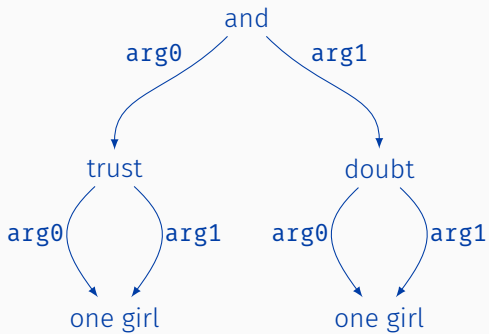


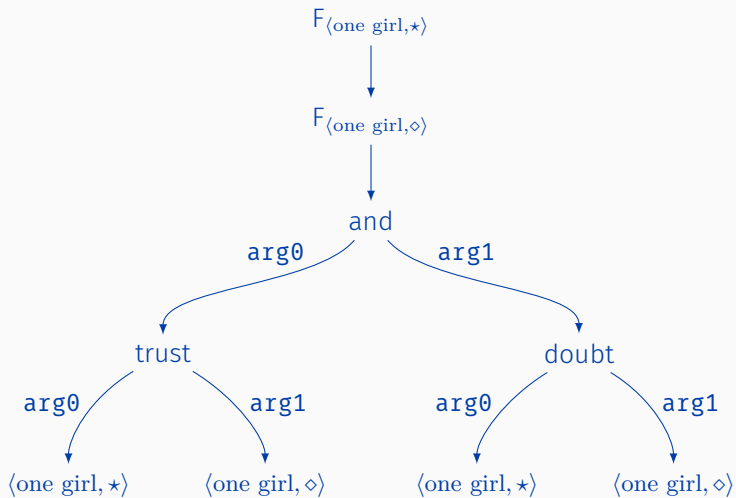


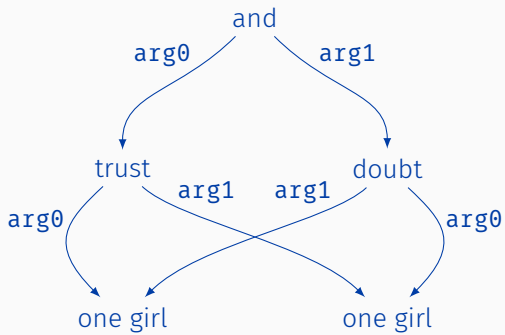












Let G be an regular tree grammar and T_1, \dots, T_n be linear top-down tree transducers, all over the ranked alphabet Γ . Given a graph $g \in \mathbb{G}_\Gamma$, is $g \in \mathcal{L}(G \circ T_1 \circ \dots \circ T_n \circ F)$?

Theorem

For every RTG G , sequence of TDTTs T_1, \dots, T_n , and $k \in \mathbb{N}$, there is a polynomial p_k such that the membership problem is decidable for every $g \in \mathbb{G}_T$ with treewidth k in $O(p_k(|g|))$.

Theorem

Let $t \in \mathbb{T}_T$ be a tree with folding depth k , then the treewidth of $\llbracket F \rrbracket(t)$ is at at most $k + 1$, and this is a tight upper bound.

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- Theoretical work on formal foundations of language processing
- Applied work in media analysis (Codemill AB, Smart Video Nordic, Accurate Player)

