K-Best Spanning Tree Dependency Parsing With Verb Valency Lexicon Reranking

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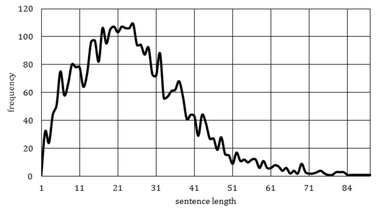
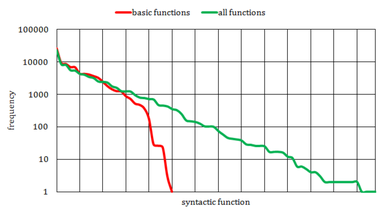
Introduction and setup

Depencency parsing of morphologically complex languages still poses a challenge, especially when paired with small dependency treebanks.

We aimed at improving dependency parsing accuracy for Croatian by using the Croatian Dependency Treebank (HOBS) and developed a novel generic dependency parsing approach.

The approach is tested on HOBS and compared to standard transition- and graph-based parsers.

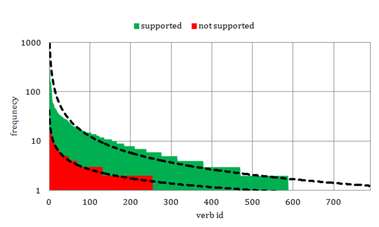


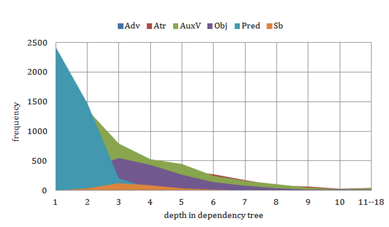


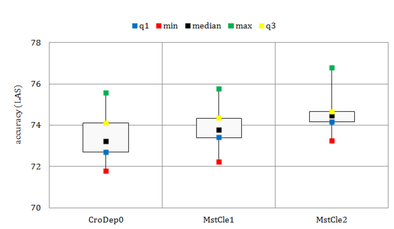
Suggested model

Notion of verb valency is inherent in the treebank, but verb valency lexicons such as CROVALLEX do exist and explicitly encode verb valency.

We have developed a parser that reranks dependency trees suggested by a MST-based parser. Reranking is done by using a verb valency lexicon.



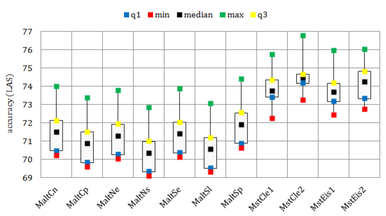


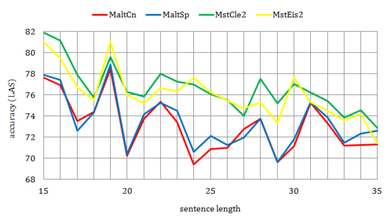


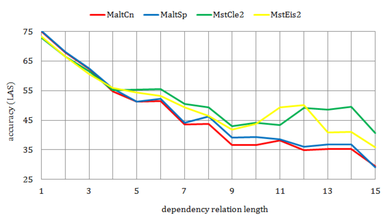
Existing parsers

MaltParser and MSTParser were used in eleven instances on HOBS with tenfold cross-validation. MSTParsers significantly outperformed MaltParsers.

The top-performing parser was a second-order arc-factored Chu-Liu/Edmonds parser from the MSTParser system (74.53% LAS, 81.69% UAS).







Parsing with CroDep

The model outperforms the existing parsers by at least 2.68% LAS in the same experiment setup on HOBS. Improvements are also observed on PDT.

The overall improvement is reached by a substantial increase in parsing accuracy for predicates, subjects and objects (more than 10.00% LAS each).