

GWV – Grundlagen der Wissensverarbeitung

Tutorial 5 : Searching

Return until 11.-13.11.2013 – Will be discussed on 15.-17.11.2013.

Exercise 1.1 : (Search and Parsing)

A syntactic structure of a sentence can be described as a dependency tree. Figure 1 shows an example of such a tree. As you can see, every word is attached to another word except “isst”, which is the root of the tree, as it’s the main verb of the sentence. A parser takes a sentence as input and produces a (dependency) tree as output.

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Read the following paper (especially Section 3):

Nivre, J. (2003). An Efficient Algorithm for Projective Dependency Parsing. In Proceedings of the 8th International Workshop on Parsing Technologies (IWPT 03), Nancy, France, 23-25 April 2003, pp. 149-160. <http://stp.lingfil.uu.se/~nivre/docs/iwpt03.pdf>

- By what operations is the input transformed into the output? What do these operations do?
 - When does the parsing algorithm terminate?
 - Describe the formal properties of a dependency tree as defined in the paper.
 - For each property: Give an example dependency tree that violates the property (it doesn’t need to make sense linguistically).

(4 Pt.)
- Try to use the proposed parser actions to produce the dependency tree depicted in Figure 1. Write down the steps and the intermediate states.

(2 Pt.)
- If you view parsing using the proposed parsing algorithm as a search problem:
 - What are the search states?

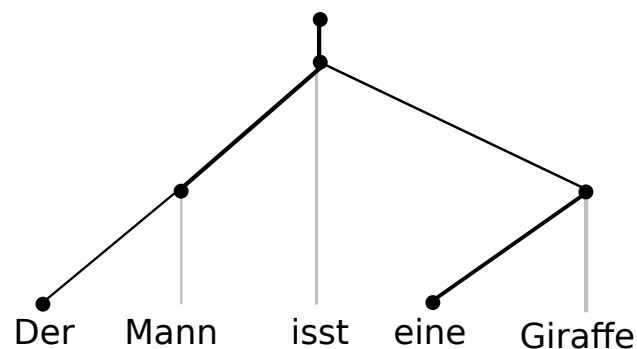


Figure 1: example for a dependency tree

- What is the start state?
- What are the end states?
- What are the state transitions?
- Can the search space be created before parsing starts?
- What is the advantage of the proposed algorithm in contrast to simply trying to find a good dependency tree by enumerating all possible trees and selecting the best one from them?
- For the search strategies discussed so far: are they a good fit for this search problem and why (not)?
- How would you design a parser using the parser actions together with an appropriate search procedure?

(6 Pt.)

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Achievable score on this sheet: 12