

Extensions of Parsing Algorithms Based on Normal Forms

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The application of parsing algorithms is limited by a number of factors – primarily the type of the grammar, as most of these algorithms are designed for context-free grammars, along with further restrictions resulting from the structure of the individual algorithms processing these grammars. Considering any grammar can be converted into a normal form, parsing algorithms based on normal forms remove these restrictions, and therefore present a universal solution. This presentation focuses on these algorithms, and potential expansions further increasing their power.

The first part of the presentation introduces the Cocke-Younger-Kasami (CYK) algorithm as a representative of this group of algorithms, and discusses extensions that would allow for parsing of non-context-free grammars in normal forms similar to the Chomsky normal form. Subsequently, it outlines the complications resulting from the adaptation to individual grammar types.

The second part demonstrates several adaptations mentioned previously, as well as introducing solutions to the problems they entail. These include the adaptation of the algorithm for context-sensitive grammars in the Kuroda normal form, scattered context grammars in the 2-limited normal form, and synchronized L-systems. Finally, possibilities for further extensions of the CYK algorithm are discussed.