Canonical scattered context generators of sentences with their parses

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Abstract:

As scattered context grammars generate their languages in a parallel way, it is natural to investigate their use related to parallel parsing, which is usually based on a suitable parallel grammatical model. Quite recently, scattered context grammars without erasing productions have been used in this way. Specifically, they were used to generate their sentences together with corresponding parses – that is, the sequences of productions whose use lead to the generation of the sentences. It was demonstrated that for every recursively enumerable language, L, there exists a scattered context grammar whose language consists of L's sentences followed by their parses. Consequently, if we eliminate all the parses, we obtain precisely L. This characterization of recursively enumerable languages is of some interest because it is based on scattered context grammars without erasing productions that generate languages included in the family of context-sensitive languages, which is properly contained in the family of recursively enumerable languages.

As canonical derivations fulfill a crucial role in parsing, this presentation will introduce canonical scattered context generators of sentences with their parses. More specifically, there exist two fundamental types of canonical derivations – leftmost and rightmost derivations. Accordingly, we define proper leftmost and rightmost generators of sentences with their parses. In terms of these generators, I will also introduce the characterization of recursively enumerable languages by analogy with the characterization described above.

Based on:

A. Meduna, J. Techet: *Canonical scattered context generators of sentences with their parses*. Theoretical Computer Science 389, pages 73-81, 2007.

A. Meduna, J. Techet: *Scattered Context Grammars and their Applications*. Southampton: WIT Press, 2010. ISBN 978-1-84564-426-0.