Regulated Grammars and Automata

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Language Theory with Applications 2013

Abstract

In essence, *regulated grammars and automata* are based upon classical grammars and automata extended by an additional mathematical mechanism that prescribes the use of rules during the generation of their languages. From a practical viewpoint, an important advantage of these models consists in controlling their language-defining process and, therefore, operating in a more deterministic way than general models, which perform their derivations in a quite unregulated way. Perhaps even more significantly, the regulated versions of language models are stronger than their unregulated versions. Considering these advantages, it comes as no surprise that formal language theory has paid an incredibly high attention to such regulated formal models, which represent the principal subject of our presentation.

The presentation is divided into two parts. In the first part, we introduce our brand new monograph that is going to be published by Springer in early 2014 [1]. This monograph represents an in-depth treatment of regulated grammars and automata. We talk about the motivation behind this book and discuss its purpose, focus, approach, use, and target audience. We also summarize its contents and coverage.

In the second part, we discuss a type of regulated grammars to which a whole chapter in the monograph is dedicated: *one-sided random context grammars*. They represent regulated grammars based upon context-free grammars, where a set of *permitting symbols* and a set of *forbidding symbols* are attached to every rule, and the set of rules is divided into the set of *left random context rules* and the set of *right random context rules*. A left random context rule can rewrite a nonterminal if each of its permitting symbols occurs to the left of the rewritten symbol in the current sentential form while each of its forbidding symbols does not occur there. A right random context rule is applied analogically except that the symbols are examined to the right of the rewritten symbol. Apart from this, these grammars work just like context-free grammars. We discuss these regulated grammars in detail by providing established results and mentioning open problems.

References

[1] Alexander Meduna and Petr Zemek: *Regulated Grammars and Automata*, Springer, New York, pp. 680, 2014 (expected)