

informatik-Kolloquium

Der Fachbereich Informatik der Johannes Kepler Universität Linz¹ lädt in Zusammenarbeit mit der Österreichischen Gesellschaft für Informatik (ÖGI) zu folgendem Vortrag ein:

Dr. Mikhail Barash

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On a New Model to Specify Programming Languages

Freitag 13. November 2015, 13 Uhr
Raum JKU S3-218 im Science Park 3

Abstract:

Context-free grammars have been a model for defining syntax of various kinds of languages since the early days of Computer Science and they found their foremost application in specifying programming languages. However, their expressive power turned out to be insufficient to express many useful constructs, such as cross-reference, which reduces their applicability.

The present work attempts to implement N. Chomsky's idea (1959) of a phrase-structure rule applicable in a context and introduces an extension of context-free grammars equipped with operators for referring to left and right contexts of the substring being defined. In this model, a rule, for example, "A -> a & <B & >C" defines a symbol "a", as long as it is preceded by a string defined by "B" and followed by a string defined by "C". The conjunction operator in this example is taken from conjunctive grammars (A. Okhotin, *Conjunctive grammars*, J. Autom., Lang. Comb., 2001), which are an extension of ordinary context-free grammars that maintains most of their practical properties, including many parsing algorithms.

The present work gives two equivalent definitions of the new model of grammars with contexts: by logical deduction and by language equations, and establishes some basic properties of the model, including a cubic-time general parsing algorithm; this time can be improved to linear for LL and LR subclasses of grammars. A variety of examples of grammars with contexts is constructed, with the most extensive example completely specifying the syntax of a simple typed programming language.

Short Bio:

Mikhail Barash is a researcher and scientific coordinator in Turku Centre for Computer Science (Turku, Finland). His research interests include formal grammars, parsing algorithms, computational linguistics, and compiler construction and implementation. Mikhail obtained his Ph.D. degree in Discrete Mathematics from University of Turku, Finland, focusing on studying different extensions of context-free grammars and their applications to defining syntax of programming languages.

Univ.-Prof. Dr. Hanspeter Mössenböck.
Institut für Systemsoftware

¹ Der Fachbereich (<http://informatik.jku.at>) besteht aus folgenden Instituten:
Application Oriented Knowledge Processing (FAW), Bioinformatics, Computational Perception, Computer Architecture, Applied Systems Research and Statistics, Computer Graphics, Formal Models and Verification, Networks and Security, Integrated Circuits, Pervasive Computing, Software Systems Engineering, System Software, Telecooperation, Signal Processing