Dissertation

„Generating Structure Editors for Challenging Visual Languages“

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Abstract

Visual languages simplify many computer-related software- and domain-specific tasks. In order to implement those languages with a reasonable cost-value ratio, specialized tools are required. The goal of this work was to develop a system, that generates complete language implementations consisting of visual structure editors and language processing components from high-level specifications. The generator should be easily applicable, but at the same time powerful enough to implement even challenging visual languages.

My thesis combines well-known concepts and methods in the area of language implementation and supplements them with new concepts. An important part of the work is the distinction between interrelated structural abstractions – namely the semantic, editable, and representation structure. This distinction is an important mechanism to increase the generality of the specification concept and to make specifications more consistent and flexible. By using tailored domain specific and sometimes visual specification languages as well as specification libraries, language specifications are raised to a very high abstraction level. Examples for those high-level abstractions are visual patterns and generic drawings, which allow a very intuitive specification of graphical representations. Based on these concepts the DEViL system has been developed. It has been used for an extensive practical evaluation.

Keywords

Visual languages, structure editors, generators, attribute grammars, specification libraries.