Generative properties of shape grammars

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The talk will focus on shape grammars and how they can capture design languages and are used as generative design tools to generate a large variety of design alternatives. A shape grammar is a set of rules that apply step by step to shapes to generate a language of designs. I'll start by a general introduction to shape grammars highlighting the concepts and formalism used and introduce the work of George Stiny and James Gips [1, 2] in order to present the basis of this system. Formalisms of shape grammars as algebras, weights, labels and concepts of emergence, embedding and sub-shape will be highlighted [3]. Emergence is a structural concept of shape grammars and it consists on the unanticipated or accidental outcomes of a design derivation. In design practice emergence is one of the main features that triggers creativity. Shape grammar research has shown that, within a strictly circumscribed space of designs, it is possible to be creative and generate innovative designs [4]. The difficulty in developing a computer design system that supports emergence has divided the shape grammar community into two groups. On one side there are the ones that are interested in exploring the pure power of shape grammars and don't make efforts to develop computer programmes and on the other side the ones that want to develop computer systems even if not addressing features like emergence which will also decrease the creativity aspect of the grammars. Finally, I'll end with some examples of analytical grammars and original grammars, the former more aiming at capturing existing design languages and the later aiming at developing totally new languages of design. Discussion will be done on the possibilities that both bring to shape research and to the exploration of design alternatives.

REFERENCES

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