KNOWLEDGE-BASED DESIGN SYSTEMS IN ARCHITECTURE

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ABSTRACT
This paper describes continuing research in the Architectural Computing Unit of the University of Sydney on the development of knowledge-based design systems in architecture. It is broken into three parts:

(i) antecedents - how did we get here?
(ii) the present - where are we?
(iii) a future - where might we go from here?

Antecedents
Fundamental analytical notions of design concerning systemic views of divisibility, procedural and declarative design, goal-orientedness and the systems view of design are briefly presented.

The Present
A model of design as a goal-oriented decision making exploratory learning search activity which results in the descriptions and/or plans for the production of descriptions of artifacts is presented. Based on a hierarchy of design complexity design knowledge is examined for its incorporation into knowledge-based design systems. Design in a state-space model is used. Knowledge for both the generation of and the selection of points in this state-space is discussed. Within this context knowledge-based design grammars are exemplified. Expert systems for both design analysis and design synthesis are presented in various domains. The use of planning systems for the more efficient search of the state-space is presented with examples from working systems provided.

A Future
Directions for future work in the areas of learning and integration with CAD systems will be suggested.

The talk will be illustrated using material from running systems written in Prolog.
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