

A VIEW CREATION SYSTEM FOR DATABASE DESIGN

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RESEARCH PROBLEM

A user view is a representation of reality relevant to a particular user or group of users for a specific purpose. User views are particularly important to logical data base design because they dictate what data and relationships are to be made available to the users. Historically, the generation of user views has relied heavily upon human experience and judgment rather than mechanistic algorithms. Therefore, the research question being addressed is: "Can the process of generating user views be automated in order to increase the quality and consistency of data base design while relying less on scarce expert human skills?"

BACKGROUND LITERATURE

The process of eliciting a user's view of a data base is called *view modeling*. A number of approaches to view modeling have been described in the literature. Most of these assume that the task is performed by a data base design expert who obtains information about the user's needs through interviewing, examining existing documentation, and other traditional means. To this extent they suffer from two weaknesses: 1) they require the user of a scarce resource — the expert data base designer; and 2) the designer's knowledge of the application is necessarily second-hand. However, if the data base design knowledge could be codified in a computer program, it could be replicated and applied wherever needed. Then the user, who has a direct and comprehensive understanding of the application, could become the designer of his own data base view.

RESEARCH DESIGN

To address the research question, an expert system, called a *View Creation System* is being developed, whose function is to automate the process of creating user views.

The underlying data model, which serves as a basis for the system, is the Entity-Relationship Model.

The research plan is divided into four phases. The first phase has been completed and consisted of developing a prototype system to elicit user information requirements and translate those requirements into a set of Third Normal Form relations representing a view. The second phase concentrates on expanding the system's knowledge base to incorporate expertise from additional data base designers. This is accomplished by observing designers' performances as they solve real and hypothetical design problems. The rules and heuristics thus identified are incorporated into the system. Phase three will extend the system to allow multiple users to cooperatively design a single, communal view. There are, however, some complex integration algorithms which must be examined and hopefully dealt with during this phase. Finally, the system will be tested by comparing its output with that of human designers. Where the system's views are found to differ from those of the human designers, an evaluation will be performed to determine which design is better. Since individual user views tend to be relatively simple, it is expected that this assessment will not present great difficulties for a reasonably sophisticated analyst.

CONTRIBUTION OF THIS RESEARCH

The scholarly significance of this research lies in the insight it will provide into the process of generating user views. Specifically, a formalized set of rules for this phase of data base design will be obtained and codified in the knowledge base. The implementation of the system will serve as a vehicle for proving that the knowledge base is an adequate formalization of the view specification task. The practical significance is that, if successful, the resulting system will greatly alleviate a critical bottleneck in applying data base technology.