A Model for Interactive Systems Design

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This paper describes a model for the representation of interactive information systems. In terms of the model, it is possible to specify the performance and characteristics, internal and external, of the system. The system designer can adjust the organization of the data, the search and retrieval algorithms, and the operational appearance of the system.

The basis of the modeling system is a general graphical data representation with an associated language for describing the specialization of the data organization and the system/user interaction. For the representation of a large body of interrelated information, a connected graph is a convenient, effective, and natural structure.

Model definition involves the definition of the following components.

1. The graph: the set of permissible interrelationships.
2. The system: the named structure composed from the graph.
3. The access method: the kind of interaction to be used in transacting with the graphical model.

Two distinct methods of access exist, namely: the Questionnaire Method and the Form Method. These methods may be used separately or jointly to determine the access method of the system being modeled.

The Questionnaire Method defines a strictly formatted, question–answer kind of interaction. The generic node names (node labels) and the relationships (links) are used to direct the questionnaire.

The Form Method defines a conversational kind of interaction in which the relation names and node contents are combined in a set of user-defined forms and phases.

The Questionnaire Method is simple to understand and use. The Form Method requires extensive analysis of its use in order to be effective. Correctly

used, however, the Form Method produces dramatic results. The application being modeled and the orientation of the users of the application determine the best choice of access method for the system.

To explore the characteristics and attributes of the modeling device, several diverse applications have been considered and are briefly discussed in order of increasing complexity. The simplest application uses the Questionnaire Method of access exclusively to permit the creation, maintenance, modification, and use of a Bibliography system.

LEGAL COUNSEL uses both the Questionnaire and Form Method to perform a lawyer/client matching service which attempts to correlate the experience and availability of the lawyer with the assets and requirements of the client.

In the Army Base Personnel Control System, an initial, very basic set of facts is repeatedly enriched by structural extensions. The integration of two functionally similar systems is also considered.

CURRICULUM-I attempts to perform a creative teaching function in the area of Computer-Aided Education. The Form Method of access is used exclusively to sustain a conversational dialog with students in order to determine what they already know, help them better formulate their knowledge, and teach them additional lessons.

Finally, the most complex model attempted, CURRICULUM-I with learning, uses the same teaching methods as CURRICULUM-I; but, in addition, attempts to assimilate each independent lesson into a single, comprehensive, intelligence simulating model.