



Chapter XXVII

**A Systematic
Relationship Analysis
for Modeling
Information Domains**

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Many conceptual modeling and system design methodologies provide tools to help system designers to model the real world. No guidelines exist, however, for determining the relationships within conceptual domains or implementations. RNA (Relationship Navigation Analysis), based on a generic relationship taxonomy, provides a systematic way of identifying useful relationships in application domains. Developers can then implement each relationship as a link. Viewing an application domain from the relationship management point of view and modeling from a philosophy of maximum access provides a unique vantage point for application design. We present RNA and its generic relationship taxonomy, describing their use for system analysis.

MOTIVATION

When re-engineering a legacy system for the World Wide Web or developing a new Web application, how does a systems developer determine what to link? A vital aspect of hypermedia system design is identifying relationships and implementing them as links (Fielding et al., 1998). Yet, many relationships in applications—including analytic applications—are poorly identified or ignored in current hypermedia

design methodologies (Isakowitz et al., 1995; Koufaris, 1998; Lange, 1994; Schwabe et al., 1996). Furthermore, many Web applications do not take advantage of the major hypermedia features of the Web—linking, structural and navigational features. Few designers explicitly think about their applications' interrelationships and whether users should access and navigate them directly. This occurs for several reasons (Bieber and Vitali, 1997). In part, few applications demonstrate a rich link structure that could serve as examples for system developers. In part, few tools exist that help system developers to think of an application in terms of its relationships (Bieber, 1998a; 1998b). RNA (Relationship Navigation Analysis) was developed to solve these problems.

RNA can be used as part of a systems analysis, either to thoroughly describe an existing system (or information domain) in terms of its relationships, or to understand a system being designed.

RNA provides systems analysts with a systematic technique for determining the relationship structure of an application, helping them to discover all potentially useful relationships in application domains. These later may be implemented as links. RNA also helps determine appropriate navigational structures on top of these links. RNA enhances system developers' understanding of application domains by broadening and deepening their conceptual model of the domain. Developers can then enhance their implementations by including additional links, meta-information and navigation.

In the following section, we introduce the philosophy of maximum access and the hypermedia philosophy of design. The next section gives an overview of RNA's steps. For the rest of the chapter, we focus on the third step: relationship analysis. First, we introduce RNA's generic relationship taxonomy. Second, we describe a deeper layer of the taxonomy: the domain independent categories. Third, we present an example case study. Fourth, we present some future directions. Finally, we close with a review of the contributions of this research.

HYPERMEDIA AND DESIGN

Hypermedia can be thought of as the discipline of relationship management (Isakowitz et al., 1995). It considers a system in terms of the relationships among its elements and processes, focusing on how users gain access to them. This view of relationship management follows two philosophies: the "philosophy of maximum access" and a hypermedia philosophy of design. The philosophy of maximum access grants users full freedom to access and explore at will, helping them better understand a domain as a whole and build confidence in application results. Under this philosophy, any element of interest to a user should be a candidate for linking. Under the hypermedia philosophy of design, hypermedia analysis should play a part in the design of every application with user interaction. Also, hypermedia access should supplement many application's feature sets (Bieber, 1998b).

RNA provides a systematic approach to realizing a philosophy of maximum access within computer applications, supporting a hypermedia philosophy of design. RNA has the potential to establish new standards for designers in the application development process and for users' interaction with applications. Designers should

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