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Chapter XIII

Managing Organizational Hypermedia Documents: A Meta-Information System

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Recently, many organizations have attempted to build hypermedia systems to expand their working areas into Internet-based virtual work places. Increasingly, it becomes more important than ever to manage organizational hypermedia documents (OHDs); metadata plays a critical role for managing these documents. This chapter redefines metadata roles and proposes a metadata classification and the corresponding metadata schema for OHDs. Furthermore, a meta-information system, HyDoMiS (Hyperdocument Meta-information System) built on the basis of this schema is proposed. HyDoMiS performs three functions: metadata management, search, and reporting. The metadata management function is concerned with workflow, documents, and databases. The system is more likely to help implement and maintain hypermedia information systems effectively.

INTRODUCTION

Today, hypermedia documents are growing explosively in many organizations because of a large number of attempts to develop systems employing intranets or extranets for enhancing their business performance. Through these systems, significant progress has been made in communication and collaboration among employees in many organizations (Lai, 2001). These systems include hypermedia documents (hyperdocuments) for supporting organizational tasks. Hyperdocuments employed for such tasks are referred to as organizational hyperdocuments (OHDs). They typically play a critical role in business, in the form of, for example, invoices, checks, or orders. The maintenance of OHD is becoming a burdensome task; managing their needs is as important to economic success as is software

maintenance (Brereton, Budgen, & Hamilton, 1998). A hypermedia document–a special type of digital document–is based on the inter-linking of nodes, such as multimedia components, etc. (Nielsen, 1993); i.e., it is an application of hypertext technologies employing multimedia components (Fluckiger, 1995). In contrast to other digital documents, a hyperdocument has links to various nodes, "hyperlinks," that are used as a path for the navigation.

Most of the previous studies on metadata for digital documents have investigated the topic from a technical perspective, such as information discovery. However, corporate digital documents are closely related to business tasks in an organization. In this context, OHDs typically have complex relationships with both information and business processes. The OHDs can impact the speed of communications and the productivity of business processes. Accordingly, OHDs should be designed to support collaboration among workers in business processes. This aspect needs to be considered in defining metadata of the OHDs for their effective management. Furthermore, such documents should be also considered from a technical aspect. The system resources used by OHDs are a considerable part of the organizational assets.

The two objectives of this chapter are (1) to propose metadata classification and metadata schema for OHDs, and (2) to implement a meta-information system on the basis of the schema. The system was designed to support the maintenance of OHDs. Our research is rooted in previous studies on the various types of multimedia documents so as to capture the more generic perspective of metadata.

METADATA AND META-INFORMATION SYSTEM

Metadata is generally known as data about data (or information about information). Metadata for digital documents has been explored from various research perspectives: mixed media (Chen, Hearst, Kupiec, Pederson, & Wilcox, 1994), multimedia representations (Kashyap & Sheth, 1996), document objects (Sutton, 1996), and networked information resources (Dempsey & Weibel, 1996). Much past research has concentrated on the use of metadata to support access to media- and application-specific documents. This metadata describes various system properties, such as video (Jain & Hampapur, 1994; Hunter & Armstrong, 1999), images (Anderson & Stonebraker, 1994; Kiyoki, Kitagawa, & Hayama, 1994), or speech and text document (Glavitsch, Schauble, & Wechsler, 1994). In contrast to these, it has been suggested that media-integrated metadata should be developed for the management of documents with heterogeneous properties. There have been attempts to do this (Mena, Illarramendi, Kashap, & Sheth, 1996; Shklar, Sheth, Kashyap, & Shah, 1995).

These studies have described metadata roles in various technical aspects from the perspective of document types or system environments. Efficiency in document access control or interoperability of heterogeneous documents has been discussed as the prime problems of these systems. A set of hyperdocument metadata, the Dublin Core (Dublin Metadata Core Element Set) (Dempsey & Weibel, 1996; Weibel, Godby, Miller, & Daniel, 1995; Weibel & Iannellla, 1997; Bearman, Miller, Rust, Trant, & Weibel, 1999; Weibel & Koch, 2000), has also focused on the information discovery; it has a limitation in managing OHDs (Murphy, 1998) like other metadata sets (Lang & Burnett, 2000; Li, Vu, Agrawal, Hara, & Takano, 1999; Karvounarakis & Kapidakis, 2000) that are developed for discovering or controlling information resources on the Internet.

Metadata of OHDs should be considered beyond the technical aspects by including an organizational aspect toward organizational memory (OM) because they are a major source