



Chapter 14

Adaptive Web Representation

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Users tend to have varying preferences regarding multimodal access representations. The number of alternatives provided by paper-based media is inherently limited. Adaptive hypertext applications do not share this limitation. This paper classifies them into three categories of information, and their corresponding interface representation: Content of documents, primary navigational system comprising links between and within these documents, and supplemental navigational systems such as index pages, trails, or guided tours.

INTRODUCTION

This chapter introduces a classification framework for adaptive Web representations. Adaptive components extend an information system's functionality and replace general-purpose documents that are written according to a wide audience model and the user's anticipated needs. While being motivated by a user-centered design perspective, the question goes beyond the scope of interface design or document presentation. Current efforts include the development of Web-based architectures that take advantage of adaptive system behavior. Emphasizing the role of annotations, the described framework comprises three categories of information and their corresponding interface representation: Content of documents, primary navigational system including the links between and within these documents, and supplemental navigational systems such as index pages, trails, guided tours, or overview maps.

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ANNOTATIONS

Most scholarly articles and books exemplify explicit hypertextuality in non-electronic form by using a sequence of numeric symbols to denote the presence of footnotes, signaling the existence and location of subsidiary texts to the main document (Burbules & Callister, 1996; Snyder, 1996). However, as far as printed material is concerned, the reader rarely is exclusively attracted by the footnotes and “becomes fascinated with the nonlinearity and incompleteness of such a collection of fragments, just as one does not give up a novel to start reading the phone directory” (Rosello, 1994). Annotations are similar to the concept of a footnote in traditional texts, but usually are added by an author or, collaboratively, by a group of authors different from the producer of the main document. Common interface representations of annotations include textual additions or various visual cues such as icons, highlighting, or color coding.

CONTENT-LEVEL ADAPTATION

Technically, the term content-level adaptation refers to all different forms of data embedded in hypertext documents. In practical terms, however, almost all prototypes and implemented systems concentrate on textual segments, neglecting visual and audiovisual forms of data. A good indicator for the granularity of adaptivity is the average length of textual segments. Scope for contextual variability is introduced by establishing an independent format for storing these segments, and by incorporating a flexible mapping algorithm to provide various types of traversal functions. A large number of very short textual elements ensure maximum flexibility and (potentially) a very exact match between the presented information and the user’s actual needs. However, the required efforts to maintain the database as well as the rule set significantly increase with the number of distinct elements.

Nielsen (1999) classifies content-based adaptation into the following categories: *Aggregation* (showing a single unit that represents a collection of smaller ones), *summarization* (representing a large amount of data by a smaller amount; e.g., textual excerpts, thumbnails, or sample audio files), *filtering* (eliminating irrelevant information), and *elision* (using only a few examples for representing numerous comparable objects). One of the simpler but nevertheless quite effective low-level techniques for content adaptation is conditional text (also referred to as *canning* or *conditionalization*), which requires the information to be divided into several chunks of texts (Brusilovsky, 1998; Knott, Mellish, Oberlander, & O’Donnel, 1996). Each chunk is associated with a condition referring to individual user knowledge as represented in the user model. Only those chunks appropriate for the user’s current level of domain knowledge are considered when generating the document. The granularity of this technique can range from node-

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