Adaptation as summarization: the role of rhetorical and narrative structures

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Abstract: Research in the field of adaptive hypermedia aims at increasing the effectivity and comprehension of hypermedia. Important criteria for the effectivity of information are coherence and informativity. A hypermedia presentation is informative for a specific user if it does not contain information already known to that user and if it contains the required information. Precisely this combination of coherence and informativity may cause comprehension problems. Namely, by omitting the parts that are not informative for a specific user, for instance based on keywords, essential components for the coherence of the argumentation or narrative may disappear. This hampers the comprehension of the final tailored hypermedia presentation. In this paper we show how rhetorical and narrative structures between (groups of) nodes and objects within nodes contribute to adaptivity of hypermedia.

Keywords: Adaptive hypermedia, rhetorical and narrative structures

1 Introduction

The work presented here aims at developing an authoring framework that helps authors building informative adaptive hypermedia documents from which tailored presentations can be generated. For instance, an educational adaptive hypermedia document, consisting of several interconnected nodes (or pages), may be adapted to the knowledge or preferences of a specific pupil. Adaptation may imply leaving out certain nodes or parts of nodes (i.e. objects, e.g. a paragraph, an image, a video fragment) from the original document. The selection of nodes and objects may be based on the knowledge of the pupil, e.g. topics already known to the pupil are omitted. The selection may also be based on the available time. For instance, if the pupil can only spend one hour studying the information, a summary of the original document, containing only the most relevant information, is created.

At this moment a first version of the framework is available (cf. [Veenstra, to appear]). This framework offers guidance with respect to several aspects of creating adaptive hypermedia, for instance:
1. Combining hypermedia objects into nodes (e.g. How does the use of stretchtext in a node influence the surrounding objects in that node?);
2. Indicating how the objects must be related in presentations (i.e. which objects must be used together, which ones can possibly be left out, given the purpose of the presentation);
3. User interface aspects (e.g. Add links to prerequisite knowledge to each node);

4. Applying different types of adaptivity, adaptation methods and techniques (e.g. navigation adaptation, link hiding [Brusilovsky 1996];
5. Using standard Web technology to develop and to make available adaptable content (e.g. XML, XSL-T, Web browsers)

The framework is based on ideas from the field of adaptive hypermedia and ideas from the fields of rhetorical and narrative analysis. Furthermore it was inspired by experiences with building a prototype of an adaptive hypermedia service, using XML, XSL-T, JavaScript and HTML. This service allows users to automatically generate a tailored version of a document by answering some questions about their preferences and goals. After they answer the questions they get access to a tailored version of the content (See Figure 1).
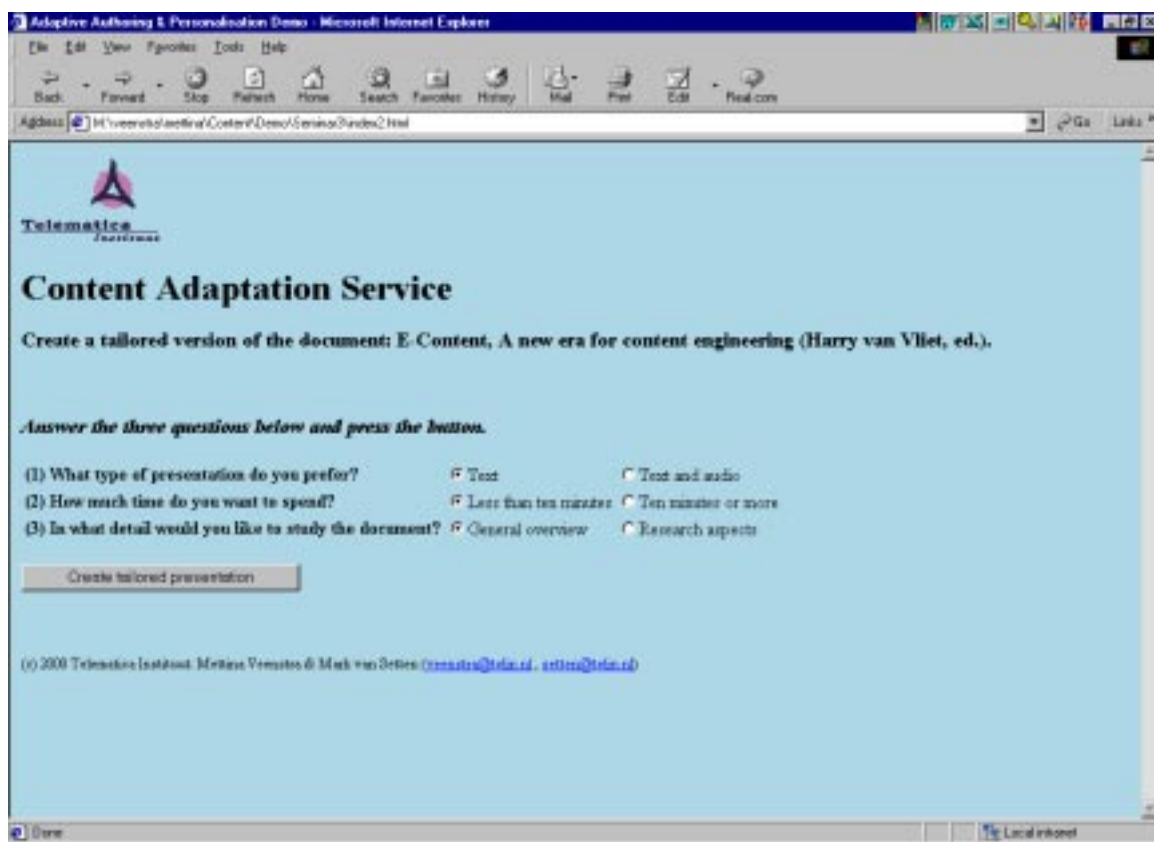

Figure 1: Page that makes it possible to create a tailored version of a document

In this paper the emphasis is on aspects of the framework described in point 2: Indicating how objects must be related in presentations. This point is relevant for adaptive hypermedia since one of the ways to increase the effectivity and comprehension of a hypermedia document is by making it adaptive in the sense that irrelevant objects or nodes for a specific user are omitted or made less accessible (e.g. by link hiding). However, omitting objects or nodes solely on the basis of e.g. keywords or information categories may harm the cohesion of the final presentation. Namely, keywords or information categories describing objects do not carry information about the relevance of

the object in the argumentation within a presentation. Nevertheless, a smooth argumentation and narrative is essential for the cohesion of a presentation. In this paper we identify ideas from narrative and rhetorical analysis that could be deployed in order to generate fluent tailored presentations.

2 Terminology

We briefly illustrate the terminology used in this paper with a short description of the adaptation process (see also Figure 2; the italic terms below refer to terms used in this figure). Adaptable hypermedia *documents* (i.e. sets of *multimedia objects* with *metadata*) are adapted to the user by matching a description of the user (*knowledge about the user*) with the *design knowledge* the system has and *metadata* of the available multimedia objects. The adaptation of the document performed by a *hypermedia adaptation service* results in a *presentation* that is adapted to the *user*.

Content	Service	Presentation	User