

Multimedia Human-Computer Interactions

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Abstract

In this paper, we propose an extensible framework based on XML (Extensible Markup Language) family for *the management of the Web presentations* published on the site of a company involved in *e-business*. This framework takes into account the centralized management of a flexible tool able to automatically generate complex and attractive SMIL multimedia presentations, and the manner of distributed storage of hypermedia. By thus, the work of the site manager of the company is facilitate, the site server is discharged, and all members of the company, regardless their speciality, could cooperate to the permanent development of the Web site, having access to a friendly user-interface experience. Our proposed framework is platform-independent and could be easily implemented on any operating system.

Introduction

The Web became a space where the first chance for the impact of any offering is to be presented in a seductive way. Each quality must to be underlined and capitalized. The success of the Microsoft Power Point application in the off-line tutorials is now integrated and expanded by the SMIL [7] and XHTML+SMIL [6] languages for creating multimedia Web presentations, both being based on the XML language – Web Consortium's recommendation ([12]). The Web site of a company involved in *e-business* must follow the principles of a user-centered interface design, so can't ignore the attraction exerted on the site visitors by the animation and the temporization of multiples media type documents.

Nearby the implementation of the public-relation service, the updating of the out of date information or the permanent necessity of modifying the general design, the dynamics of a company site is reflected by the necessity of integrating the presentations of new products, important events, future projects, company leaders, etc., which could be conceived in an animated and synchronized manner.

We shall expose a management system of the Web presentations published on the site, so as the multimedia information is stored in a distributed manner. Our proposal leads to a site profile that we think is very catching for the Web visitors and to a friendly user-interface experience for the members of the company who want to contribute at the site development, without the need of any knowledge of Web programming languages. By thus, it shall be obtained a unitary and attractive profile

of the company, and the communication between the company's employees shall be notably improved. XHTML, SMIL, XML and free-source script languages (CGI, JavaScript, PHP) could be used for this implementation.

Creating multimedia Web presentation with SMIL

SMIL (Synchronized Multimedia Integration Language) is an XML-based language [7] developed since 1998 by the Web Consortium in order to facilitate the creation of *interactive multimedia presentations*, similar to those from T.V. SMIL enable authors to describe the temporal behavior of a multimedia presentation, associate hyperlinks with media objects or describe the layout of the presentation on a screen. A presentation is composed from several components, each including different media types, such as audio, video, image or text, and could be executed sequential, parallel or in a combined manner. Control buttons such as stop, fast-forward and rewind allow the user to interrupt the presentation and to move forwards or backwards to another point in the presentation.

SMIL 2.0 – the actual version of the language – is defined as a set of reusable markup modules. This allows reuse of SMIL syntax and semantics in other XML-based languages, in particular inside those that need to represent timing and synchronization [1]. For example, SMIL 2.0 components are used for integrating timing into XHTML [8] and into SVG [2]. There exist special players for SMIL developed by some companies, as the RealOne of RealNetworks or Oratrix's GRiNS player and editor. The general trend is to incorporate support for SMIL even in the Web browsers: Internet Explorer 5.5 and up plays XHMTL+SMIL, Apple's QuickTime 4.1 and up supports SMIL 1.0 and Adobe's SVG Viewer supports SMIL animation in SVG [11].

As example, we list below a short SMIL document which split the screen into two regions, a movie and a text file being displayed in parallel for 20 seconds, each in a region, while in the background a song is playing:

```
<!DOCTYPE smil PUBLIC "-//W3C//DTD SMIL 2.0//EN"
    "http://www.w3.org/TR/REC-smil/SMIL20.dtd">
<smil xmlns="http://www.w3.org/2001/SMIL20/Language">
<head> <layout type="smil-basic-layout">
    <region id="MoviePlace" top="5" left="25" width="875" height="650"/>
    <region id="TextPlace" top="655" left="25" width="875" height="20"/>
</layout></head>
<body> <par> <audio src="song.rm" dur="30s">
    <video region="MoviePlace" src="movies/m1.rm" dur="20s">
    <text region="TextPlace" src="docs/subtitrate1.html" dur="20s">
</par> </body> </smil>
```

Why SMIL and not HTML+TIME?

HTML+TIME language was developed by the Microsoft, Compaq and Macromedia companies for facilitating to the authors to add time-based presentation effects to Web pages than using an external, XML-based document. Thus, HTML+TIME extends HTML by adding a set of time-based attributes to its entire existing tag set [10]. For example, an identical set of attributes could be applied to a paragraph, an unordered list and a table, which shall be displayed in parallel each for 4 seconds, but starting at different moments:

```
<!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 4.01 Transitional//EN">
<html> <head> <style> time {behavior: url(#default#time2);} </style> </head>
<body> <div class="time" repeatCount="5" dur="10" timeContainer="par">
  <p class="time" begin="0" dur="4">First, a line of text.</div>
  <ul class="time" begin="2" dur="4"> <li>Second, an unordered list</li>
    <li>with 2 elements</li> </ul>
  <table class="time" begin="4" dur="4" cols="2" rows="1" border="1">
    <tr><td>Third, a table</td> <td>with 2 columns</td></tr> </table>
</div> </body> </html>
```

The goal of our system's structure is to offer to each company's member which contribute to the site development the possibility of being the only manager and answerable for all information and multimedia documents inside his/her presentations, making changes whenever wants. For this purpose, by using SMIL, all auxiliary and automatically generated presentations' files shall be stored on the local computer from that member's office. By this way, is avoided the charging of the site server.

Moreover, a SMIL presentation can play only in a region of the site, having no interaction with the rest of the Web page. In contrast, using HTML+TIME, through the HTML DOM (Document Object Model), all the elements in the page can interact with each other, participating in the presentation. For our organizational model, is strongly recommended for the presentations to be independent with the rest of the company site, so SMIL is the suited solution. Even Dave Raggett, one of the HTML developers, approve that SMIL is great for timing media clips, e.g. presenting an HTML document along with an audio commentary and accompanying images [9].

Multimedia Management System

The process of developing and maintaining the site of a company involved in *e-business* is a very complex one, not only necessitating the appropriate hardware and software support, but implying a great number of specialists: *project manager, system architect, creative lead, security architect, database developer, component developer, UI (user interface) developer, graphic artists, HCI (Human-Computer Interaction) engineer*, and even others [4]. In a past article [3] we proposed a model for the management of the information resources inside an academic institution that use and

develop in the same time different related educational projects, taking into account two aspects of the organization approach: the outlook of the data formalism for the information system and the pursuit of a set of directions for facilitating and stimulating the collaborative communication between all project teams members.

Presuming a similar infrastructure for information management inside a company, we are focusing now on the aspects of managing the Web presentations published on the company site. The site manager could conceive – in XHTML [8], for example, - a Web form by which to ask for all information necessary to build a SMIL presentation: text, audio, video, graphic streams of data, associating with the action of this form a CGI script which to generate the desired SMIL presentation file. For example, a product could be progressive presented in some slides by: its name, technical characteristics, a comparison with older versions or the motivation of new proposed product, practical advices of use, similar existing products (with their prices and technical differences), the price of product, a special offer (discounts / promotional price). The script have to take over the content of each field of the form in a variable, creating a file with each textual information, and then to generate the tags of the SMIL file, specifying the names of all existing files as values for animation and temporization attributes. Disposing by such a form, any member of the company could easy build a SMIL presentation, storing it on the computer from his/her office.

For integrating the presentation into the company site, the employee could use another Web form – provided by the site manager, too – where to fill in the complete path on his computer through the generated SMIL file, the name and a short description of the presentation. This information is transformed into an XML document by the script associated with this form action, being automatically sent to the site manager, who could affiliate this file to the general site of the company, by associating a hyperlink in the site with the SMIL file. We choose XML because this document type could be processed regarding formal rules defined by a Document Type Definition (DTD) or an XML schema [5]. By this way, on the server shall be stored only the corresponding XML document, not entire the presentation. The structure of the XML document could be, for example:

```
<presentation type="product"> <!-- product / event / person -->
  <item type="text/smil"> <name>NewProcessor</name>
    <description> A new ... </description> <desc href="doc.smil"> ... </desc>
  </item> </presentation>
```

Because a SMIL presentation constitute an attractive manner for presenting a personal idea or the results of the work, a set of similar Web forms could be put at the disposal of all company members to facilitate the professional communication between them. By this way, SMIL presentations could become a familiar dialect for different speciality persons, without being necessary the knowledge of SMIL language or others programming matters.

Conclusions

For our presented site management system, in which we intend to define and manage the Web presentations in separate documents, stored in different places and managed by diverse persons, SMIL is the appropriate language for the synchronization and integration of Web-based multimedia sources, making the development and management of multimedia Web pages a more streamlined, efficient process[9]. The XML-based property of SMIL language is one important prerogative, beyond its capacity of making the message in the transmission clearer or more attractive.

A future direction in our research shall regard the possibilities for the company members to modify their presentations from anywhere, including via WAP, and to store the multimedia files on multiple computers, in a complex distributed manner. Also, taking into account the maintenance of Web presentations' professionalism level, we shall try to design a set of Web agents which to gather useful information from similar Web presentations or from reference bibliographical resources.

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