SMIL – An Introduction

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Overview

The Synchronized Multimedia Integration Language (SMIL; pronounced "smile") enables authors to bring interactive audiovisual content to the Web. With SMIL, producing audio-visual content is easy; it does not require learning a programming language and can be done using a simple text editor.

SMIL is an XML-based language. It was developed by the W3C Synchronized Multimedia (SYMM) Working Group, a unique mix of experts from the four divergent industries (CD-ROM, Interactive Television, Web, and audio/video streaming) interested in bringing synchronized multimedia to the Web. The W3C SYMM Working Group included key players such as Compaq, CWI, INRIA, Intel, Lucent/Bell Labs, NIST, Nokia, Macromedia, Microsoft, Netscape, Oratrix, Philips and RealNetworks.

The current version of SMIL (SMIL 2.0) became a W3C Recommendation in August 2001.

Example

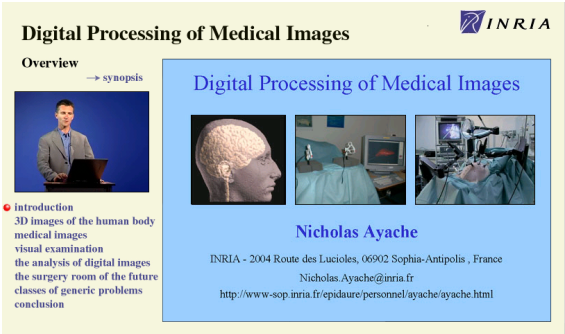

Fig 1: A SMIL Presentation on Digital Processing of Medical Images

Fig 1 shows an example SMIL presentation. A researcher was asked to come into a studio and to give a presentation of his scientific work, which was recorded on video. Then, SMIL was used to integrate and synchronize the audio and video recording with the slides used in the talk. Moreover, a table of content was added that enables viewers to navigate between different parts of the presentation (see left hand side of Fig 1, below video of speaker).

Key Features

Media Objects

The core component of a SMIL presentation are individual media objects such as a video, an audio file or a set of images. All media objects are referenced via URLs rather than physically embedded into the SMIL file. For example, videos stored in a digital video library can be reused in many presentations. Different media objects in a presentation can be stored on different servers -- another benefit of using URLs.

SMIL enables authors to use clipping to extract relevant pieces of larger audio and video media objects, thus allowing editing without modifying the source file.

Timing and Synchronization

A primary contribution of SMIL is timing and synchronization markup. SMIL elements allow the author to describe whether media objects should be played in sequence, in parallel, or are exclusive. SMIL attributes are used to refine the synchronization relation between media objects.

Layout

Layout of media objects on a screen can be done using either a flat or a hierarchical layout model. It is also possible to assign media objects to different windows.

Animation

SMIL animation works by changing the value of an XML attribute over time. Different types of interpolation are supported, as well as special constructs for animating colors and motion. SMIL animation is also used by SVG (Scalable Vector Graphics) to provide animation functionality.

Content Control

SMIL content control enables authoring presentations that dynamically adapt to user preferences and to the platform to which the content is delivered. For example, authors can indicate that an audio track is available in several languages, thus increasing the potential audience of the content. Also, authors can express that a media object such as an audio track is available in different versions, each having been encoded for a different transmission bandwidth. This guarantees that presentations can be played even when only low-bandwidth access is available.

Linking

SMIL linking markup has been inspired by HTML, and offers similar functionality. In addition, SMIL addresses timing aspects of linking. For example, it is possible to split a video into different time segments, and to associate a different hyperlink with each segment. Moreover, it is possible to control the timing behavior of the presentation that is the source of a link when the link is followed (source continues playing, pauses, stops etc.).

Metadata

SMIL allows to associate metadata with both the full presentation and individual media objects using RDF (Resource Description Format).

Transition Effects

Transition effects are commonly used in slideshow presentations, e.g. to fade out one slide and fade in the next when transitioning between slides. SMIL authors can use the 133 wipe transition effects defined in SMPTE 258M-1993, as well as a number of SMIL-specific effects, (push-wipe, slide-wipe, fade). SMIL transition effects can be applied not just to video and images, but to any visual media object.

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See also: http://www.w3.org/AudioVideo