

XML TECHNIQUES FOR VIDEO INFORMATION DESIGN AND RETRIEVAL INSIDE AN E-LEARNING PLATFORM

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The interactive multimedia tutorials became a common presence in the E-learning field. We expose here a mechanism through which the tutors can easily edit their teaching materials, and the students can find quickly a video fragment related to a certain topic. Our approach is based on two XML technologies: SMIL and XQuery languages, the first for storing the interactive multimedia tutorials, and the second for querying these tutorials in order to locate the video content complying with a certain subject.

The video materials are the most appreciated by the distance students, providing them with an intuitive, deep understanding of the scientific content. Being a binary data, the video content can not to be processed in order to find out the topics it relies with. The SMIL language facilitates the creation of interactive multimedia presentations with video streaming having associated metadata and temporal information. Being XML documents, the SMIL presentations can be processed via DOM, or by using SAX, but there exists also a specialized module called PerlySMIL, dedicated to create dynamic SMIL files using Perl.

Our approach set out from a SMIL presentation skeleton, which contains the general layout of the multimedia tutorial, consisting in three delimited areas: one for the video/animations streams, one for the accompanying subtitle, and one for pointing out the main ideas of the tutorial. The tutor shall establish the exact temporal diagram of the objects displayed in the three areas: along the duration of each video stream, there shall be changed many subtitle sequences, as well as some focused ideas.

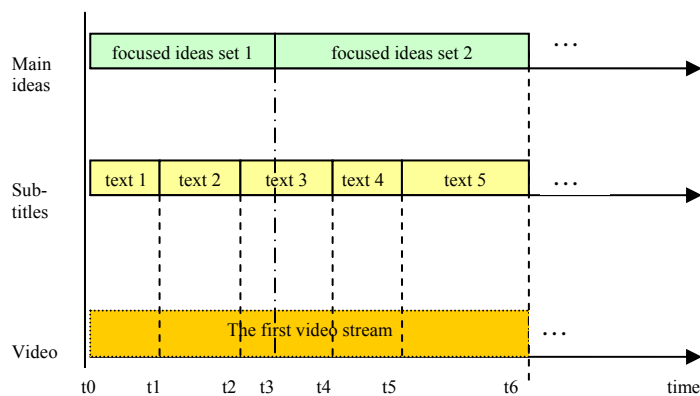


Fig. 1 The multimedia presentation time diagram

By the Web tutorial design tool, the tutor specifies all the video/text references, accompanied by the temporal markers, and by the descriptive metadata. A Perl script creates all the necessary SMIL elements, including them into the SMIL skeleton. The subtitles and the focused ideas shall be organized in a separate HTML document, containing many sections (one for each marked temporal moment), and the SMIL document shall contain references to each of this sections.

A video content searching tool is also available in order to provide, for each keyword, a set of SMIL presentations, which video stream begins exactly at the clip referring to that keyword. This tool is based on a XQuery processing of the SMIL presentations (for locating the video streams and their corresponding moments, using the keyword search inside the textual information), followed by a temporary SMIL document generation, using PerlySMIL module, and taking into account the "clipBegin" SMIL attribute.

References

[1] M. Brut, *Managing Multimedia Information within E-learning Platforms*, Proceedings of ROSYCS 2004, Scientific Annals of "Al. I. Cuza" University, Computer Science Section, Tome XV (2004)

[2] * * *, *W3C Technical Reports and Publications*, Boston (2005): <http://www.w3.org/TR/>