Software orchestrates Web presentations

By Ted Smalley Bowen, Technology Research News

April 3/10, 2002

Like television before it, the Internet was supposed to bring learning to anyone near the right screen at the right time. While the Web holds more promise as an educational vehicle, timing issues still make it difficult to coordinate the kind of multimedia presentations that can convey lessons in living color.

Although Web technologies are evolving to better handle streaming files that have strict timing requirements, pulling together different types of files drawn from multiple sources into a single, coherent presentation still takes a lot of work.

With the classroom in mind, a research team from the University of Applied Sciences in Germany has developed a scheme that allows teachers to organize digital text, audio and video into databases, then draw from their own and other teachers' databases to compose multimedia lessons.

The scheme allows teachers to pull together digital teaching material without having to rely on programmers or having to become programmers themselves, according to Thomas Schmidt, director of the computer center at the University of Applied Sciences.

The researchers' Media Object Model software is a framework for composing multimedia lessons for a classroom or the Web. The framework uses metadata within the files, like information about formatting, authorship, and access privileges, to smooth the sharing process.

The framework includes an object model, database, lesson planning toolkit and interface that a teacher can use to assemble master documents, or presentations, according to Schmidt.

Each database includes a reference list of its constituent parts and a set of active references, or actions that can be performed on other teachers' databases specified in the reference list. The framework also accommodates annotations.

To pull together a presentation from disparate databases, teachers can specify actions based on the type of metadata contained in each database. They can also draw information from different databases based on the active references contained within the data; the software keeps everything synchronized and spatially coordinated, according to Schmidt.

There are already document models for assembling and presenting teaching materials via the Web, and there are also several standards initiatives aimed at adding time-sensitivity to the Web to allow animation, video and other multimedia files to be streamed efficiently to users' browsers.

The researchers' framework, however, allows teachers to combine and reuse these types of media, and coordinates complicated interactions, said Schmidt. "The database allows for a context-sensitive file system view. An author will experience objects in the specific [presentation] context, even though the same object may appear in a completely

different context, as well. This eases the authoring process of complex structured presentation enormously," he said.

The Media Object Model includes the Media Information Repository database that stores information and keeps track of how the data is organized using a modified form of structured query language (SQL).

The model's Web authoring tool uses a screenplay motif and shows a graphical view of each presentation's spatial arrangement and playback sequence. The tool includes a set of methods and a programming interface that allows extensions to be added so it can access other applications, according to Schmidt.

Although the database, object model and toolkit are specific to the researchers' scheme, it also uses standard Web technologies, such as Extensible Markup Language (XML) and streaming media protocols, according to Schmidt. XML is a common coding scheme used to create Web pages. Streaming media refers to time-sensitive materials like video and audio.

A key component of the scheme is reordering media files from their semantic data storage grouping into the playback sequence on the viewer's end, a task handled by a flow generator, said Schmidt.

"Our data structures on the storage layer are organized in a semantic tree. Time, however, in our lives, is linear, so there has to be a resolver, which requests the right data in time and reorganizes temporal instructions in a linear fashion," he said.

To view sequential presentations, users must have Java virtual machine software installed on their computers.

While the researchers tested their model using custom-written data objects, adapters could be written to allow the software to handle existing files, Schmidt said. "The information scheme we use is encoded in XML. So there is no principal difficulty in providing in/out filters for [other] content," he said.

The researchers are working on adding graphical tools that will allow users to edit the XML code, arrange presentation views and timing, and edit the interactions between objects, Schmidt said.

Parts of the scheme are ready for classroom use, while others are still prototypes. The model will be completed in 9 to 12 months, he said.

Schmidt's research colleagues were Bjoern Feustel, Andreas Karpati, Torsten Rack. It was funded by the University of Applied Sciences.

Timeline: < 1 year
Funding: Government
TRN Categories:
Story Type: News
Related Elements: Technical paper, "An Environment for Processing Compound Media Streams," initially presented at the 7th International Conference of European University Information Systems at Humboldt University in Berlin, March 28-30, 2001>

Page One Archive Glossary Resources Research Directory

Newsletters and Reports TRN Store Feedback Letters Comments

Find out about TRN Services for Web sites and print publications.

About TRN