Session 6: Multimedia Models, Frameworks, and Document Architectures

Chair: Rita Brennan, Apple Computer

This session consisted of two long papers, one which targeted multimedia model integration and object management, while the other focused on the scheduling of multimedia documents.

"An Integrated Platform and Computational Model for Open Distributed Multimedia Applications" by G. Blair, et. al. was presented by the gregarious Francois Horn of CNET, France. Francois opened up by explaining why the paper's researchers chose a synchronized processing graph model approach to their work. Francois explained that the primary reason for this decision was so they could study synchronization constraints closely.

Francois then discussed the object modeling of their research. There are basic objects (defined by earlier research from ANSA) and reactive objects which exhibit synchronous behavior programmed by Synchronization Managers. The programmer must be aware of reactive objects in the system. Hence the programmer needs a coherent view of the application-system relationship.

Francois provided an example of a machine to illustrate the model’s concepts of integration, object encapsulation and synchronization. Francis stressed that synchronization is key to the application’s success and asked that more research be done in global system synchronization.

At the end of his session Francois addressed several questions on synchronization for reactive systems.

"Scheduling Multimedia Documents Using Temporal Constraints" was presented by M. Cecelia Buchanan. Cecelia, a PhD candidate at the University of Washington, discussed her joint research with Polle Zellweger at Xerox PARC.

Cecelia described their algorithm and application, known as Firefly, which runs on Xerox’s Cedar system. Their primary goals for this algorithm are to enhance synchronization of asynchronous components and dynamic media in existing synchronous documents. Another key goal of Firefly is to ease authoring tasks.

The algorithm performs four key chores: computing media item durations, finding connected components, assigning time to events and creating commands.

According to Cecelia, temporal constraints have three parts: media, operations, and synchronization constraints. To address temporal constraints, they designed a Firefly Scheduler to automatically produce a schedule for controlling the display of a Firefly document.

Firefly is a runtime architecture with three components: a Viewtime System, which manages a documents schedule; the Event Handler, which filters asynchronous events and the media items themselves which execute the operation lists and watch out for naturally occurring asynchronous events.

To illustrate examples, Cecelia briefly described their technique for composing a graph representation of documents. Asynchronous events are managed first. There are three parts to the Firefly system on Cedar: the first is an authoring environment for
creating test documents, the second is the Firefly Scheduler which consists of a suite of analysis tools and the third part is the display on a run-time system. Components are connected with time events assigned to them.

Cecelia's presentation generated a large amount of questions and future discussion. Most of the questions were on synchronization and several on how to handle "dead-air" and error-recovery.