Engineering Aspects of Web Hypermedia:
Examples and Lessons from the GRiNS Editor

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Overview

Creating Hypermedia for the Web and Mobile Devices
• Environment
• The SMIL Language
• Problems and Possibilities

Supporting Application Development
• The GRiNS/A Editor
• Illustrated Design Example

Issues for Future Work
• Modeling the end-to-end environment
• Supporting cross-platform development
• Providing reliable results
What’s the Big Deal?

- The Internet is not a time-friendly environment
  - There is no notion of a common clock
  - There is no fixed bitrate available
  - There is tremendous variability in bandwidth
  - There is increasing variability in devices
  - User interaction can blow away most schedules
Requirements for Ubiquitous Hypermedia

Common Delivery Platform

• Lots of proprietary solutions have existed
• Move to SMIL as a common language
• Supported on desktop, mobile, capture devices

Problems to be Overcome:

• SMIL is simple to make but tough to manage
• The runtime environment is very different from the creation environment
• Better tools for a range of designers are required.
SMIL in a Nutshell

<smil xmlns="http://www.w3.org/2001/SMIL20/Language">
  <head>
    <meta ... />
    <layout> ... </layout>
  </head>

  <body>
    <par>
      <img id="Backg" region="Background" src="MainBackground.gif" fill="freeze"/>
      <seq id="W1media">
        ...
      </seq>
    </par>

    <par dur="29s">
      <video region="Image" dur="29s" src="ScalpleBreaks.mpg"/>
      <img region="Oly" begin="7" dur="4s" src="Overlay.gif" customTest="Annotations"/>
    </par>

    <img region="Image" src="Images/SectionT-1-R.gif" dur="5s"/>
    <video region="Image" dur="27s" src="Video/RemoveBrokenScalple.mpg"/>
    <img region="Image" dur="5s" src="Images/SectionT-1-E.gif"/>
  </seq>

  ...

  </par>

  </body>

</smil>
Example: New York, New York

Key Concepts

• Shows a Basic Slide Show
• Shows Scalable Configuration
• Uses Audio, Video, Text
SMIL 2.0 Acceptance

Widely Used, Little Known
- SMIL is in lots of devices but often transparently
- 1,635,243 SMIL telephones will be made today

Importance Goes Beyond Media
- Key is *Synchronizing Information*

Overview of Implementations
- RealPlayer 10 (RealNetworks)
- IE-6 (Microsoft)
- GRiNS (Oratrix)
- Quicktime (Apple)
- Ambulant (CWI)
- Mobile Devices
SMIL 2.0: Goals

Provide a declarative XML multimedia format
  • key concept: no scripting

Support Simple Scheduling, plus…
  • user interaction and content navigation
  • flexible and adaptive timing facilities
  • multi-device content control and layout
  • simple animation and transitions facilities

Provide Flexible Implementation Framework
  • modularized standard with reusable components
  • new profile architecture
What is SMIL?

Module Overview

Structure  | Timing & Sync  | Media Objects  | Layout  | Transitions  | Linking
---|---|---|---|---|---
 | Meta-information  | Animation  | Time Manipulations  | Content Control

Profile Overview

Language Profile  | XHTML+SMIL Profile  | MMS / PSS6 Profile  | Basic Profile

http://www.cwi.nl/projects/AMBULANT  10 August 2004
A Short Discourse on Timelines

Timelines: A Visual Mapping of Time to Space

• A timeline can define one execution path through the structure, but not the structure itself.
Why Wasn’t it TMIL?

The Structure Gives Essential Information

- Semantic and scheduling encapsulation
- Facilitates content and presentation re-use
- Facilitates non-trivial content substitution
- Allows you to construct updates dynamically
Representing SMIL

Hierarchies Don’t Draw Well
• Lots of lines, lots of levels

Timelines Don’t Capture Structure
• Terrible for non-linear presentations or switches

Structured Representation (from GRiNS)
More Information on SMIL
Part II

Supporting Application Development
Implement ‘Author-Once’ Multimedia

GRiNS/A: Open SMIL Development

Media Assets (Content)

Database Content

GRiNS Editor
- Visual Authoring
- Environment Modeling
- Interactive Previewer
- Multi-Format Exporter

High-End DVD/Cable/DSL

Conventional Web Streaming

Mobile & Wireless

Presentation Templates

GRiNS Environment

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Engineering Issues Addressed by GRiNS

Problem Space

- Application Design
- Implementation
- Testing
- Maintenance

Non-Focus

- Content production
- Requirements Analysis
- Use Analysis
Design Example: New York, New York
Part III

Needs for the Future
Hypermedia and the Future

The Current State

• Maximal Use is Emerging for Digital Media
• Minimal Use is Made of Hypermedia

The Future

• The Web environment is heterogeneous
• Delivery will remain constrained
• Creating content is much easier than presenting content
• Making relationships among media is key
SMIL and the Future

The main advantages:
- Open, declarative format
- Easy to author, easy to edit
- Presentations don’t corrupt content
- Easy to increment and maintain

The main disadvantages:
- Not many cheap editing tools
- Not many samples
- For sexy presentations, programming can be better
GRiNS and the Future

The main new directions:

• Reduce or eliminate cost
• Focus on multi-target publishing
• Integrate presentation evaluation
• Integrate device aware authoring

The problems:

• Authoring is seen as luxury
• Automatic authoring is an illusion for high-end
• Making presentations is a cost (not profit) center
Contact Information

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