Lecture 10: Multimedia for the Web

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What is Multimedia?

• Multimedia is everything you can hear or see: texts, books, pictures, music, sounds, CDs, videos, DVDs, Records, Films, and more.

• Multimedia comes in many different formats. On the Internet you will find many of these elements embedded in web pages, and today's web browsers have support for a number of multimedia formats.
Format of Embedded Multimedia on Web

- Audio
- Video
- Animation
- VRML
- Slides
- ....
Format of Embedded Multimedia

• Multimedia elements (like sounds or videos) are stored in media files.

• The most common way to discover the media type is to look at the file extension. For example, rm. represents RealVideo.

• The major impediment to multimedia on the Web has been bandwidth - the amount of data that can be transferred to the user's browser.

• Until recently, most users had only a 14.4K modem, which was not really adequate for sound or video. 28.8K marks the lower end of the useful multimedia bandwidth range.

• Simply announce on your home page that you do have some really cool Java, Shockwave, VRML, or whatever, and here are the links…
Embedding Sound in Web Pages

• Audio is an extremely efficient way to deliver information. Good quality sound is known to enhance the user experience substantially so it is worth investing in professional quality sound production.

• Offer a choice if possible.

• Midi, WAVE, RealAudio, SND, AIFF, AU, MP3…
Formats for Audio

• **MIDI (The Musical Instrument Digital Interface)**
  - a music-definition language and communications protocol enabling electronic instruments from all manufacturers to communicate musical information. MIDI does not capture and store actual sounds. Instead, it is a set of data which describes the specific steps that a soundcard or other playback device must take to generate the same sounds via electronic synthesis.
  - MIDI files are very much smaller than other audio files. A one-minute MIDI file might require about 10 KB of disk space.
  - There are several types of plug-in software for playing back MIDI files, such as Crescendo!, Yamaha's MIDPLUG, and Netscape's LiveAudio.
Sound

• Playing sound on the web:
  – Using A Helper (Plug-In) : A helper application is a program that can be launched by the browser to "help" playing an audio.
  – Using The <bgsound> Element
  – Using The <embed> Element
  – Using A Hyperlink
Sound

• An example

<EMBED
src = "MIDI/Classical/flying.mid"
width = 300
height = 50
loop = FALSE
align = right >
Video

• Video is good for:
  – Promoting television shows, films, or other non-computer media.
  – Giving users an impression of a speaker's personality.
  – Showing things that move. Product demos are also well suited for video.
Video

- Video is not yet widely deployed at web sites, due to the huge storage and bandwidth requirements.

- The most common regular video formats are
  - MPEG for all platforms, much smaller for the same quality.
  - AVI for Windows, developed by Microsoft. The AVI format is supported by all computers running Windows, and by all the most popular web browsers.
  - Quicktime (MOV) for Mac (and Windows too), developed by Apple.
  - The RealVideo format was developed for the Internet by Real Media. The format allows streaming of video (on-line video, Internet TV) with low bandwidths. Videos stored in the RealVideo format have the extension .rm or .ram.
Video

• A special consideration for video (and spoken audio) is that any narration may lead to difficulty for international users as well as for users with a hearing disability.
• The classic solution to these problems is to use subtitles.
• The figure shows a subtitled frame from Sun's Starfire video.
Video

• For other tips in making web-suitable video clips, visit.
Video

• Playing video on the web:
  – Using A Helper (Plug-In): A helper application is a program that can be launched by the browser to "help" playing a video.
  – Using The <embed> Element
  – Using A Hyperlink
Animation

• Most Web animation requires special plug-ins for viewing (except GIF)
• Most animation is nothing more than a distraction.
• Simple animation on a Web site's main home page can provide just the right amount of visual interest to invite users to explore your materials.
• Animation can also be useful in illustrating concepts or procedures.
• When you have animation that relates to the content of your site, one way to minimize the potential distraction is to present the animation in a secondary window. This technique offers a measure of viewer control.
Animation

• Methods for animating pages.
  – Self-contained GIF animation. The only thing GIF lacks is sound and real-time control.
  – Java.
  – Shockwave, Flash (formerly FutureSplash). Macromedia's Shockwave plug-ins and Flash are leaders in plug-in animation.
  – QuickTime
  – mBED are interactive multimedia interfaces within web pages. They include graphics, animation, sound.
  – Enliven and Sizzler
  – JavaScript animations require preloading and users can disable Javascript in their browser.
  – Framation (TM) is a technique using a combination of meta-refresh and frames.
Animation

- http://www.jonesandjones.com/
VRML

• VRML (Virtual Reality Modeling Language, wrl.) files are delivered by Web servers in much the same way that HTML files are.
• Unlike standard Web browsers, though, VRML viewers require 3D navigational controls to allow the user to explore the model.
• VRML uses text descriptions to represent geometry, material, texture, lighting, scale, rotation, positioning, lighting, and perspective data that is used to describe the objects that comprise a static three-dimensional world, referred as a scene description.
A sample code for VRML

Cube/Cylinder Code

#VRML V1.0 ascii
Separator { 
#Logical grouping of everything in this document
DirectionalLight { 
  direction 0 0 1
#Creates a direction light shining into scene
}

DEF RedCylinder WWWAnchor { 
  name "http://pubs.internet.com/mayJun96/redcyl.html"
  description "A red cylinder linked to a HTML document"
  Material { diffuseColor 1 0 0 } # Red
  Transform { translation 4 4 1 } 
  Cylinder { 
    parts ALL
    radius 1.5
    height 5
  }
}

DEF BlueCube WWWAnchor { 
  name "http://pubs.internet.com/mayJun96/bluecube.html"
  description "A blue cube linked to a HTML document"
  Material { 
    diffuseColor 0 0 1 # Blue
  }
  Transform { 
    translation -2.4 .2 1
    rotation 0 1 1 .9
  }
  Cube { 
    width 2
    height 2
    depth 2
  }
}
Cosmo VRML Plug-in viewer
Slide Shows

- Slide shows are another method for delivering multimedia on the Web.
- Synchronize audio with still images using video editing software.
Delivery of Multimedia on Web

- It makes no difference how high-end your video server and network are if your users are running low-end desktop machines that cannot handle the demands of playback.
Delivery of Multimedia on Web

• **Streaming Media**
  – sends data to the desktop continuously but does not download the entire file.
  – Example: RealVideo (rm. or ram.)
Delivery of Multimedia on Web

- Benefits of streaming technology
  - Random access.
  - A lower storage demand on the client machine.

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Delivery of Multimedia on Web

• **Downloadable media**
  – is temporarily stored on the client machine in memory or on the hard drive.
  – The quality of downloadable media is generally higher than that of streaming media.
  – High storage demand it places on the client machine. Even videos of short duration require many megabytes of storage.
  – Does not allow random access.
  – One solution is to split longer media segments into smaller chunks.
Delivery of Multimedia on Web

• Inform your users
  – One aspect of the Web is that you don't always know where you're going or what you'll find there.
Delivery of Multimedia on Web

• Be sure to give users status information and controls when you are presenting multimedia materials. When designing a media interface, let interaction with your media be entirely user-driven.