

CGT 353 Lecture 5

Audio

Ronald J. Glotzbach

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Two fundamental types

- Digital audio (sampled/recorded)
 - captured analog data that's been converted into digital form
 - wav
 - ogg
 - mp3
 - mp4
 - Mpeg
 - Etc...
 - Synthesized audio
 - MIDI files (.mid)



ogg

- It encapsulates raw compressed data and allows interleaving of audio and video data inside a convenient format.
- Designed to provide for efficient streaming and manipulation of high quality digital multimedia.
- Can multiplex a number of independent streams for audio, video, text (such as subtitles), and metadata.

Attributes of Audio

- Attributes:
 - Resolution/Sampling Rate frequentness of samples over time
 - Controls clarity of clip
 - Bit depth number of bits available to describe amplitude at any instance in time
 - Controls fidelity of clip
 - Channels number of independent speaker channels

Sampling

- Samples refer to instances of time captured
- A digital audio file is an approximated description of multiple samples over a given period of time then described digitally
- Although not as detailed as analog, its still good enough for humans



Sampling Rate

- When sound is recorded, samples are captured at a specific, consistent interval
- How close or far apart these intervals are is called the sampling rate
- Greater sampling rate = more samples captured
 = increased description of audio
- So, higher sampling rate = better audio clarity



Sampled Audio



Synthesized Audio

- Typically refers to MIDI files in multimedia
- Describes various notes and sounds using a synthesis chip on a computer's sound card
- Because it is recreating rather than replaying sound, synthesized sound sounds "fake"



Other Issues

- Other issues related to audio:
 - Bit rate speed of connection required for streaming to exceed download
 - Bit rate = file size / length of clip
 - Compression



Using Audio

- Audience Considerations
 - Bandwidth
 - Playback QuickTime Player or Windows Media
 Player
- Optimization
 - Length of clip
 - Channels: use only I
 - Bit depth: 8-bit versus 16-bit
 - Sampling Rate: 44 kHz, 22 kHz, 11 kHz, other...
- Applications

Measuring and Using Sound

- Audio usually measured in kHz (kilohertz)
- Sounds with a sampling rate of 44 kHz are "CD quality"
- Human ear can hear up to 20-22 kHz, so its usually not necessary to have 44 kHz on a multimedia file
- Should never go lower than 11 kHz, which is adequate for voice but not for music
- It is always best to start with high quality files then downsample them

Bit Depth

- At each captured sample, the computer has to represent the audio amplitude with a certain number of bits, described as **bit depth**
- Bit depth controls audio fidelity or dynamic range

Why Understand it?

- It is important to understand the basics of sound to incorporate them adequately
- If not used properly, sound files can
 - sound horrible or
 - be far too large
- You can use sound for a variety of things including
 - interactive navigational objects,
 - sound tracks, and
 - voiced narrative



HTML5 <audio>

<audio controls="controls"> <source src="sound1.ogg" type="audio/ogg" /> <source src="sound1.mp3" type="audio/mp3" /> Your browser does not support the audio tag. </audio>

Click link to play audio

<script type="text/javascript" src="js/jquery-1.7.1.js"></script> <audio controls="controls" id="audio1"> <source src="click.ogg" type="audio/ogg" /> Your browser does not support the audio tag.

</audio>

Click here for sound effect