21M.380 Music and Technology
Sound Design

Lecture №13
Analysis and requirements specification

Wednesday, March 16, 2016

1 Anonymous sound

- What sound is this?

1.1 Brainstorming session 1

In groups of 4, discuss:

- Which sounds and acoustic effects would a steam train drive-by scene need to include? Feel free to include cliches from Western movies!
  - _____
  - _____
  - _____
  - _____
  - _____
- Which environmental acoustic effects would need to be considered?
  - _____
  - _____
  - _____

1.2 Group discussion 1

- Each group reports its findings
- Let's specify the drive-by scene in detail, with all required sounds
- Don't satisfy yourself with indescriptive nouns! Which kind of train? At what speed is it traveling?

1.3 Brainstorming session 2

- Specify sounds in yet more detail

1.4 Group discussion 2

- Each group reports its findings

2 FP1 assignment

- For your final project, you are expected to write a *Requirements Specification Document*
- Sort of like what we did now for the steam train, but in more depth

3 Online research

- Do some individual online research to find representative examples for the sounds that are required for our steam train driveby scene.
- Focus on the steam whistle and the train engine.

4 Audio/video file format conversion with VLC

- Sometimes we find representative sounds, but in the wrong format (e.g., video)
- VLC to the rescue!

5 Sound analysis with Sonic Visualiser

5.1 Import audio file

- File » Open

5.2 Playback

- Playback » Play/Pause or Space
- Play selection: Playback » Constrain Playback to Selection or S
- Loop: Playback » Loop Playback (or L) and play
- Play from cursor: Does not seem to exist ☹
- Playback speed: Use dial in bottom right corner

5.3 Tools

- Navigate
- Select
- Edit, Draw, Erase (only for some layers)
- Measure (very useful)

5.4 Navigate and Zoom

- Use navigate tool (hand) on top
- Drag mouse in small waveform at bottom
- Use wheels to zoom in/out horizontally and vertically

5.5 Spectrum

- As pane: Pane » Add Spectrum
- As layer: Layer » Add Spectrum
- Displays spectrum at current cursor position

5.6 Spectrogram

- As pane: Pane » Add Spectrogram
- As layer: Layer » Add Spectrogram
- Special flavors: Melodic range spectrogram, peak frequency spectrogram
- Spectrogram properties (gain, normalize, FFT window size to trade off time/frequency resolution, etc.)

5.7 Other layer types

- Layer » Add Notes Layer (perhaps useful to get intuitive understanding of prominent pitches)
- Layer » Add New Time Instants Layer: visual *and* audible marker

5.8 Layer operations

- Show/hide: Toggle Show at bottom of layer
- Delete: Layer » Delete Layer or Ctrl/⌘ + click

6 Analyze steam whistle sounds

Let's try to isolate and analyze the steam whistle sound:

- What does it sound like? Pitched? Unpitched? Harmonic/inharmonic? Noise component or clean tone?
- What might be a good sound generating object in Pd to base our design on?
- What other sound processing objects in Pd might be needed?

- What about the development of pitch over time?
- Is there a correlation to the development of amplitude over time?
- How might this relate to the physical sound production mechanism?

7 EX2 assignment

- Implement the steam train whistle in Pd

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