SoundPaint — Painting Music

http://www.ipd.uka.de/~reuter/soundpaint/
Motivation

• Integration of sound engineering & composing
• More expressive electronic music
• Graphics as input
• Stick close to graphical notation
• Simple, intuitive interface
Additive Synthesis

Frequency (Pitch) [Hz]

Time [s]

cluster
Sound Example
Color -> Sound

Frequency (Pitch) [Hz]

- Sine
- Sawtooth
- Triangle
- Square
- Cluster

Time [s]
Color -> Sound Mapping Goals

• User-definable
• Cover all colors
• Require only few data for definition
• Keep it simple (not targeted at math experts)
• Map color gradients => sound gradients
RGB Color Space

Additive

Subtractive

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Color -> Sound Mapping Approach

• Problem: infinite dimensional sound space
• Idea: select 3-dimensional sound subspace
• Assign 3 colors to 3 sounds
• Interpolate all other colors
• => all goals fulfilled
Color -> Sound Mapping

Color Space

Sound Subspace

Linear Combination of Base Waves

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Mapping Issues

- Just doing linear interpolation on wave forms
- => color gradients simply map to crossfading
- Does not sound very appealing, but just like mixing 3 sound sources
- Need rather something like sound morphing
Mapping Revisited

• Solution: add non-linear content
  - i.e. any sound parameter not controllable by crossfading
  - e.g. vibrato rate/depth, detune depth, echo speed, ...
  - only assumption: parameter can be linearly controlled, e.g. by moving a slider

• Now linearly
Generalized Mapping

• Interpolate sounds by
  - linear combining wave forms (wave form crossfading)
  - linearly interpolating sound parameters of non-linear sound content

• => get something similar to sound morphing
User Interface

Wave form type specific editor
linear interpolation of arbitrary wave forms

Generic Sound Parameters
linear interpolation of slider values
common for all types of wave forms

Color -> Sample Mapping

Color Settings

Sound Color 2
- Color: [Select...]
- Sample: [Triangle]

Sound Color 3
- Color: [Select...]
- Sample: [Square]

Opens editor

Wave form type selection

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User Interface (cont.)
Future Work

- Subtractive colors, HSB color space
- More non-linear parameters
- Integrated graphics editor
- Real-time capabilities, DJ stuff (looping, ...)
- Raster vs. vector graphics?
Questions?