Sound/E/scape – changing roles and hidden potentials of sonic perception in the digital age

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Sounddesign?

Audiodesign!

Design of auditory events and sonic experiences, rather than sounds and acoustic signals!
„Music is made of sound waves that we encounter at specific times and places: they happen, we sense them, and then they are gone.

The music experience is not just those sound waves, but the context in which they occur as well.“

(David Byrne, in: How Music Works, p. 267)

„I had an extremely slow-dawning insight about creation. That insight is that context largely determines what is written, painted, sculpted, sung or performed.

That doesn’t sound like much of an insight, but it’s actually the opposite of conventional wisdom, which maintains that creation emerges out of some interior emotion, from an upwelling of passion or feeling,…“

(David Byrne, in: How Music Works, p. 13)
An Old Story…
… the Semantic Gap

Psychoacoustics?

Different Layers of Auditory Perception
Effect and Meaning of Auditory Events: Four interdependent Layers

Acoustics and product-sounddesign usually focus on the information-layer
- sound as an event triggered by a physical process
  (principle of cause and effect)
  communicating manifold information about this process
  and its surrounding environment

BUT:
All four layers interdepend and interact!!!

Symbol / Metaphor:
Semantic Network of an Acoustic Signal

Example: Breaking Waves vs. Traffic Noise
- Similar signal (broadband noise), but totally different meaning!
- Not the signal, but the context is key!
Ambiguity of Sound Signals

- crackling fire
- typing on an old keyboard
- walking on stones

- Not the signal, but the context is key!
- Design of context is (sometimes) more effective
- manifold possibilities for audio design

„Orchestration“ of Sounds and Senses

- Many different sounds interfere with each other
- Combination of similar sounds to sonic streams
- Different sensual perceptions interfere with each other
"Orchestration"
Example: Mix and Mastering of Pop Music

![Graph showing frequency and level with categories like Percussion, Melody Instruments, Pad-Sounds, Singer, Bass-drum, Bass, and Encoded Sounds.]

"Orchestration"
Example: Film-Sounddesign

<table>
<thead>
<tr>
<th>Encoded Sounds</th>
<th>Neutral Soundeffects</th>
<th>Embodied Sounds</th>
</tr>
</thead>
<tbody>
<tr>
<td>Encoded Soundeffects</td>
<td>Speech</td>
<td>Rational Perception</td>
</tr>
<tr>
<td></td>
<td>osembeded Soundeffects</td>
<td>Emotional Perception</td>
</tr>
</tbody>
</table>

- Humans may listen to 2.5 different sonic streams at once
- Distribution of encoded and embodied sounds
- Raise simultan perception up to 5 different sonic streams

Compare: Walter Murch
BUT:

„There is almost never any collaboration between the composer and the sound designer, or between the composer and the supervising sound editor. And that’s a shame.”


Interference of Sensory Perceptions

Peter Abling: The Speaking Piano
http://www.youtube.com/watch?v=muCPjK4nGY4
Sound Studies – An Interdisciplinary Approach

Auditory Event Human Perception
- activity
- context
- attitude
- situation
- mood

Acoustic Signal Technical Measurement
- frequency
- level
- spectrum
- envelope
- duration

But also:
- Sociology, Social Studies, Cultural Studies,
- Philosophy, Psychology,
- Neurosciences,
- Linguistics,
- History,…

Psychoacoustics!

Sonic Experience in the Digital Age?
Cyborgs in Utopia?

Virtual Reality or Real Virtuality?

Media-Realities, Digital-Realities!

“The most profound technologies are those that disappear. They weave themselves into the fabric of everyday life“ (Marc Weiser)

What has changed?

Sony Walkman ab 1979

Nokia Mobira Senator ab 1982

Nokia Mobira Cityman 900 ab 1987

Technologies!
What has changed?

Focus and Attention!

What has changed?

„Die Verbreitung von Musik durch technische Aufnahmeverfahren ist eine beachtliche wissenschaftliche Neuerung, die aber aufgrund der Mühe losigkeit, mit der jedermann überall ohne Anstrengung alles hören kann, auch eine große Gefahr darstellt.

Der Haken des Fortschritts liegt in eben diesem Fehlen von Anstrengung, besonders in der Musik, die nur von denen verstanden werden kann, die sich aktiv mit ihr auseinandersetzen."

Igor Strawinsky,
1935 in einem Interview,
zitiert nach: Igor Strawinsky – Ich muss die Kunst anfassen,
Bibliothek der Provinz, 2006, S. 89f
What has changed?

Learning, Research, Development, Innovation?

New Tools!
New Workflows!

Open Innovation
Co-Creation
Collaboration
Interdisciplinarity
Design Thinking
User-Centered Design

BUT:

„There is almost never any collaboration between the composer and the sound designer, or between the composer and the supervising sound editor. And that's a shame."

Randy Thom, A Few Notes On Music in The Final Mix,
http://www.filmsound.org/randythom/finalmix.htm
New Fields of Activity and Employment

- Mehrkanal Beschallung
- (Interaktive) Medieninstallation
- Medienmusik für Film und Fernsehen
- Musikproduktion
- Do-It-Yourself Communities
- Game Audio
- Musikaufnahme
- WFS
- Audio in the Creative Industries
- Corporate Sound
- Sound für Werbung
- Audio-Art
- Medien-Performance
- Usergenerated Content
- Sound-Design (für Film and Video)
- Sonification und Auditory Displays
- Podcasts
- Sounddesign für Events
- Produkt-Sound-Design

New Channels of Distribution and Communication

1877:

Thomas A. Edison
Phonograph

1977: Digital Recording
1982: CD – Compact Disc
1987: DAT – Digital Audio Tape
1982: MD – Mini Disc
1997: www.mp3.com
1999: ADSL – Breitband-Internet in Österreich
2001: Apple iPod
2006: HSDPA – Mobiles Breitband in Österreich
2010: Apple iPad
Sonic Experience and Sonic Perception in the Digital Age?

Recording, storing, editing and reproduction of sound compensate some basic principles of auditory perception

- the transience of sonic energy
- the impossibility of identical repetition
- the need of a dynamic process / movement / activity triggering a sound
- the irreversible principle of cause and effect
- the linear time structure

„Something ist changing in our relationship with music!“

Bill Drummond:

„Music was no longer about time, place, occasion“
Digital Audio?

Sound and Music Computing has come up with

- loads of new algorithms
- new concepts
- new hardware, new software
- wearable instruments, mobile music, networked concerts
- generative and interactive sound and music
- ...

→ indefinite possibilities?

Digital Audio?

BUT

„…recorded music somehow reduced everything to one genre…“

(Bill Drummond)
1. STELL DIR VOR

Stell Dir vor, morgen früh aufzuwachen und die Musik ist verschwunden.
Alle Musikinstrumente, alle Musikaufnahmen – alles weg.
Eine Welt ohne Musik.
Du kannst Dich außerdem nicht einmal mehr daran erinnern, wie Musik überhaupt geklungen hat und wie man sie gemacht hat.
Du kannst Dich nur mehr daran erinnern, dass es gegeben hat und dass sie Dir und Deiner Zivilisation wichtig war.
Und Du sehst Dich danach, sie noch einmal zu hören.
Stell Dir dann vor, wie Menschen zusammenkommen, um Musik zu machen mit nichts als ihren Stimmen und ohne Vorstellung davon, wie Musik klingen sollte.
Die Musik, die sie machen würden, ist die der 17.
Current Challenges in Audiodesign?

- “Shut up and listen!” – Sound/E/scape – Re-invent Silence
- Re-create the “now-or-never” nature of sonic experience (get rid of loops and identical repetition)
- Re-create a sonic identity, a “personal” sound
- Re-create time and place specific qualities of sound

Current Challenges in Audiodesign?

- Make use of digital tools (and not vice versa)
- Integrate digital workflows (Co-Creation, Open Innovation, Interdisciplinarity, …)
- Collaborate with other disciplines
- Collaborate with audio-experts from various branches (or at least from various departments)
- Integrate new concepts and approaches towards “digital perception”
- “Orchestrate” and “mix” soundscapes rather than editing single sound signals or altering isolated frequencies
- Be aware of interference with other sensory perceptions
- Make use of multimodal concepts
- Be aware and design (sonic, visual, social,… ) contexts
Multidimensional, Adaptive & Synthetic Soundeffects and Sonification

Action / Event → Trigger → Sampled Soundeffect
On or Off
Identical Repetition
No direct Feedback

Context → Analysis & Mapping → Realtime Algorithmic Soundsynthesis
Adaption
Variation
Additional Information
Feedback

Generative Soundscapes

Microphon → Camera → Sensors → GPS → WWW → ...

Data-Analysis
- Context
- Location
- Activity
- Mood
- Usage
- Work/Leisure/Home

Knowledge Base
- Personal Profiles
- Context Profiles
- Labeled Datasets
- ...

Interference Engine, Content Classification & Machine Learning

Sound-Generator
Audio Content Classification

Feature Extraction
- Decode
- Windowing
- FFT
- Log
- DCT
- MEL Scale
- MFCC

Training
- Labeled Examples
- Machine Learning
- Model
- Labeled Examples
- Unknown Examples

Classifying

Figure: Serra, 2008

GeMMA –
Generativ Music for Media Applications

→ Semi-automated composition of filmmusic
→ Analysis of annotated film-clips
→ Circumplex Modell of Affect (James Russel, 1980)
Mobilot

Framework for location based information systems and context based computing

http://mfg.fhstp.ac.at/forschung/context-based-computing/
http://seekoi.fhstp.ac.at/

Music Enhanced Training

- Music based Bio-Feedbacksystem
- Context Data:
  Heart rate, GPS, upper arm acceleration, music, training schedule
- music, sound, rhythm, tempo influence body movement and speed
- music, sound, rhythm, tempo influence body (subjective) mood

http://www.fhstp.ac.at/studienangebot/bachelor/pl/projekte/music-enhanced-training
Interactive Sound Installations
Sound & Music Games

Toccation – Musicmuseum for children, Festspielhaus Baden-Baden
Klangturm St. Pölten

Relaxing Room
Generative Sound & Light

New concept for a generative sound- & light installation for a relaxing room in St. Martins Therme & Lodge (VAMED Vitality World) in Austria
Soni Gait

Sonic feedback in physiotherapy to improve gait rehabilitation

http://carma.fhstp.ac.at/projects/sonigait/news/

Thank you!

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