

Functional Sounds



This poster is based on the book *Funktionale Klänge: hörbare Daten, klingende Geräte und gestaltete Hörerfahrungen* by Georg Spehr. Particular focus was put on the chapter written by Daniel Hug (p. 143 ff) called: *Ton ab und Action! Narrative Klanggestaltung interaktiver Objekte*

The situation and trends

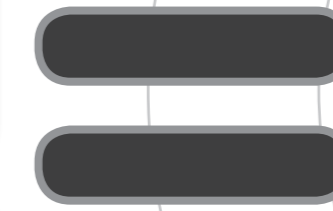
- Flood of data**
 - growing amount of data
 - increasing availability
- Increasing interaction possibilities**
 - elevated frequency of processing
 - unmanageable mass of visual displays and menus
- Disappearing computers**
 - miniaturisation of computers and HMIs (often no more space for visual display)
 - optical disappearing of interfaces (behind architectural walls or in running shoes)
 - non-mechanic interfaces (e.g. door locking device with finger scanner)



The potential of sound



- Relief of the visual channel**
 - support during focussed sight of the user
 - Extension of information intake (e.g. car navigation systems)
- Narrative potential**
 - semantic charging
 - transmitting emotions (e.g. music box)
- Natural expectations**
 - materialisation of virtual tools
 - avoidance of irritation resulting from silent HMIs (e.g. digital camera)
- Feedback**
 - for transmitting information
 - for describing conditions
 - mirroring operation processes
- Rhythm**
 - patterns and developments are sometimes better recognized audibly than visually (e.g. earthquake sonification)



The solution

adequately, individually, sensibly und complexly designed
functional sounds

The Types of use and terminology

Sound plays a major role in many kinds of media and must be specifically designed to fulfill different functions:

- in the commercial sector: corporate sounds, audio branding, audio logo, ...
- in architecture: Muzak™, fountains, ...
- in the cinematic field, radio drama and performances of all kinds: sound effects, original soundtracks, automated dialog recordings, atmospheres, ...

Additionally, the sound design for industrial products is also described in the book in terms of packaging, foodstuffs, household appliances, or automotive construction. The chapters focussed on here place emphasis on interaction design where sound is critically important, appearing as auditory displays, sonification or game sound.

Auditory Display

Presentation of diverse information by sound

- Auditory Icon / Audicon** real audio sample as sound-metapher (e.g. shuffling paper sound of the windows™ trash)
- Earcon** synthetic / abstracter sound or sound sequence (e.g. windows USB-port-activating)
- Hearcon** synthetic sound impulse for spatial orientation (e.g. traffic light ticking for the blind)
- Spearcon** accelerated speech sample (e.g. auditory menus)
- Hints** medium priority (e.g. „bing“ at low fuel level)
- Alarms & Warning Signals** simple and urgent sounds (e.g. beeping of alarm clocks or car horns)

Sonification

Audible data

- Audification** direkt data-to-sound-conversion analog to visual line diagram (e.g. metal detector)
- Parameter Mapping Sonification** multi-dimensional sonic transformation comparable to scatter plot (e.g. Twitter-sonification tweetscapes.de)
- Modell Based Sonification** (by Thomas Hermann) data don't create sound on their own but a stimulus of the user makes a data-matrix audible

Game Sound

Soundscapes for video games

- uses the same stereotypes, clichés and other narrational elements like classic cinematic sound design
- can directly influence interaction (e.g. indicate behaviour)
- must be programmed consistently and designed homogeneously
- is dynamically modifiable in an ideal case (e.g. th sounds footsteps on the marble floor are automatically altered when reaching the parquett floor)

The design requirements

Understanding listening as an interactive process

Sound is not just *there*. Its impact depends on how you listen. *What* do you hear? *What's* your intention in listening? Do you listen actively or experience sound passively? See this example of a church clock bell:

Aktive, searching listening	In figurative or causal listening we recognize: What exactly? „A church bell strikes at 1 o'clock.“	Reduced listening is called the way how something sounds like: „A deep Dongggg“
Passive stand-by listening	Unexpected but by conscious listening we hear: „A church bell“	Unconsciously / archaically we feel uneasy by the deep frequencies, our cultural imprint tells us: „The time has come!“




Fall back on sound film methods

Physikalisierung (Physicalisation) means the potential of sound giving materiality to objects (e.g. papier mâché rocks in early Godzilla movies that finally feel heavy by the help of sound)

Beseelung (Spiritualisation) describes the phenomenon when objects are given character by a certain sound (e.g. in *Tiger & Dragon* the heroin's fighting sword gets a cristalline, sacred value by an appropriate sound)

Sweetening is the art of subtle sound design for film objects by a combination of metaphoric and often archaic sounds (e.g. the space ship sound of Darth Vader's armada is a mix of airplane-sounds and distorted human screams)

Differentiate the gesture/sound-relation

Equally & directly connected	Gesture is analog with sound (e.g. accelerating handle bar of a motorbike)	
Indirectly connected	Gesture and sound share the same duration but follow different movements (e.g. legato on a violin)	
Non-isomorph	Movement of gesture is not connected to the sound (e.g. striking a bell)	

Further fundamentals of design

Context sensitive design
Before recording or designing any sound the surrounding area of the interaction must be acoustically analysed. For example if you want to design sounds for a train ticket machine you must explore the acoustical situation within several stations on site.

Design Patterns
Like in graphic or interaction design there are also generally acknowledged findings in sound design and their documentation for solving sound design challenges. (e.g. a rise in pitch is associated with switching something on, a dropping of pitch means: switch off)


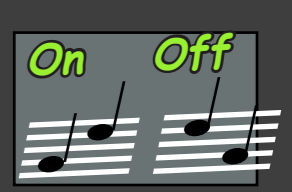



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