

Acoustic Ecology in the Digital Era

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ABSTRACT: Since the early 1980s microprocessors and digital technology have penetrated our environment and everyday life in various utensils, devices and equipment. Among other, more obvious effects to culture and society, digitalization has changed the soundscape almost everywhere in the world.

In this paper I'm reflecting on sonic experiences, both personal and shared, asking what kind of strategies could be useful in trying to observe, analyze, understand and perhaps also to improve our sonic environment in the digital era. Are the arguments used in fighting against noise pollution valid when dealing with synthetic sounds? How should acoustic balance in the environment be defined in the digital age? Scientists, scholars and artists working with sound should share and discuss their views on ecology and aesthetics of the digitalized soundscape in order to challenge designers to improve the sonic dimension of our collective environment.

KEYWORDS: acoustic ecology, acustemology, acoustic ethnography, digitalization.

1. From Schizophonia to Transphonia and Beyond

R. Murray Schafer introduced the term schizophonia already in the late 1960s to describe how original sounds are separated from their electroacoustic reproductions (Schafer 1969, 43). The word has rather negative tone, and the term transphonia has been suggested as an alternative: Heikki Uimonen defines transphonia as the “mechanical, electroacoustical or digital recording, reproduction and relocating of sounds.” (Uimonen 2005)

In addition to traditional concerns of acoustic ecology like increasing density of urban soundscapes and shrinking and disappearing of hi-fi soundscapes, digital and microprocessor-based signals have brought a completely new kind of element to the audiosphere. To me the essence of digital signals is the lack of physical origin – in contrast to sounds caused by mechanical and electro-mechanical bells, sirens, buzzers and solenoids – and furthermore their indifferent or missing connection to the actual material reality. This brings schizo- and transphonia to the next level: we are surrounded by sounds, which are not referring to anything concrete and not caused by any direct action. These beeps are like dropouts in the holistic experience of existing in the world, errors in the flow of acoustic communication.

2. Ettore Scola and my first “beep epiphany”

In his 1983 movie *Le Bal* Ettore Scola takes us to a journey through five decades of European history using a ballroom in Paris as a stage for the change of costumes, habits and, of course, music. The time travel begins from the 1930s and after German occupation, the invasion of American entertainment and the rebellious 1960s the film concludes with a parody of self-absorbed dancers in an early 1980s disco. In the very last number – a slow one – during a close-up of a dancing couple, aculeate beeping of a digital wristwatch punctures the intimate and melancholic soundtrack. Although this unmistakable sound was already familiar to me, those few seconds of the disruptive signal became the most memorable moment of the film. For me Ettore Scola was the first one to point out this new category of sounds, which had appeared in our shared acoustic space and has now spread all over the world due to the conquest of microprocessor technology and digitalization.

3. Nicolas Frize on the fake identity of synthetic signals

In April 2003 in Paris I had the pleasure to meet French composer and sound artist Nicolas Frize, who was keynote speaker in a pedagogic workshop¹ focusing on the role of sound in interactive art. Frize’s various projects include working with prisoners, hospital patients

1. La Fémis European teachers’ workshops: New media, teaching interactivity: Sound, 2. – 4. April 2003

and lots of archived sound recordings. The first part of Frize's talk was dealing with sonic memories and our affiliation with nostalgic sounds. Frize had e.g. interviewed retired elderly factory workers about the sonic dimension of their working environment, and they described how they were able to monitor large-scale industrial processes just by listening to the machinery around them. This observation didn't necessarily require any dedicated auditory display.

Frize demonstrated how soundscape reveals to us as much as we are willing to accept: the sounds reflect not only the operations and activities of our community, but also the economical, sociological and political structures of our society. This isn't, of course, anything revolutionary, there's a lot of literature on acoustic ecology dealing with these issues, but to me Frize's sharp arguments and politically charged standpoint sounded fresh and inspiring.

Later after the presentation I had a discussion with Nicolas Frize. I was interested in his opinions on the increasingly common synthetic signals, which we encounter in our everyday life. I told Frize how I couldn't help being bothered by the beeps and bleeps, which have replaced earlier electro-mechanical sounds in many environments, products and user interfaces. I confessed my romance with the sound of old Sweda model 46 cash register machine in the grocery store next to my childhood home, and mentioned how irritated I could get from hearing the swarm of barcode readers while queuing at the checkout of a supermarket.

To take one more example, the crunch of the machine stamping a cardboard bus ticket has been replaced by a beep, which appears when a plastic card is brought next to a card reader. If validating one's ticket happens using a touchscreen interface, we are also facing a serious accessibility problem. For a visually impaired person a single beep as the only response to moving one's fingers across a flat plastic surface is not very helpful.

Our conversation meandered from mobile phone ringing tones as "wearable sounds" to global capitalism and mass culture. Nicolas Frize was very critical about all preset sounds in digital devices arguing that they give people a fake sense of personalization, and that symbolic sounds (earcons²) in general are lacking a consistent design paradigm. Our discussion ended with a shared wish for new aesthetics in designing artificial audio signals.

4. The Quieting Sounds of Musical Ringing Tones

The increasingly growing number of mobile phones has affected our shared sonic space in various ways, and like with any emerging technology, different parts of the world have a different history with this phenomenon, too. Mobile devices have gained a lot of attention under different disciplines in the academic world, and a significant amount of research has been done on the sonic dimension of mobile culture. In Northern Europe the first wave

2. Earcons are not directly correlated with the visual icon or event. Symbolic sounds typically consist of single tones or motives or short melodies (Blattner et al. 1989, 2, 22).

of ringing tones was experienced from mid-1990s onwards when the crude and angular monophonic melodies, motifs and tremolos filled the air in public transport vehicles, offices and lobbies. Later on, after a few years period of simplistic polyphonic reductions of music dominating the cellphone sounds, the method of producing the ringing tone was changed from buzzers to tiny loudspeakers (Häikiö 2004, 9). This enabled the use of actual audio recordings as ringing tones, and excerpts of pop songs of various genres – typically in mp3 format – began to emanate from people’s pockets and handbags.

In 2011 I interviewed Finnish sound designer Timo Anttila who had worked for Nokia in the turn of the millennium creating a few of the early ringing tones. According to Anttila designing the sounds was not originally a distinct job, but rather a secondary role for some of the programmers who didn’t even necessarily need to understand much about music or audio as such.

It seems that the age of smartphones has caused rather radical and perhaps unexpected turn in the way people want to display their devices to others in the audible domain: at least in the North the musical ringing tones are almost extinct. A typical mobile phone alarm heard nowadays is an imitation of the sound of an old-fashioned landline telephone, but in most cases only the low burr of the vibrate is revealing an incoming call or message. Despite the fact that the number of mobile phones has surpassed the number of population in my home country already over ten years ago, the prophecy about a constant cacophony of ringing tones playing aloud in public spaces never came true. I will return to this subject later in this paper suggesting a rather obvious reason for the ceasing of mobile device signals despite the epidemic spreading of other digital sounds.

5. Exclusive Luxury Design with Factory Preset Sounds

In 2010 Finland participated the World Expo in Shanghai showcasing all kinds of technology and design in a huge bowl-shaped white building called “Kirnu” (Giant’s Kettle). I was following the process of constructing Kirnu from the first delineations until the opening day, since students from my department in Aalto University and their fellow students from the Sibelius Academy designed and realized the whole interior sound design of the building. A lot of effort was put into fine-tuning the mood, the atmosphere, the ambience, the narration and the interactive behavior of the sounds.

A specially designed elevator named ‘Lantern’, manufactured by KONE, the 4th largest elevator company in the world, was an integral part of the architecture of the pavilion, standing on its own as a light sculpture. The glass shaft and the elevator car together created a visual landmark for the main hall, enhancing the overall effect of the interior of the pavilion. (Design Curial 2010). The custom-built elevator cabin included finely designed materials such as handmade ceramic artwork for the floor and a high quality

semi-transparent glass. The elevator also featured the latest in RFID (Radio Frequency Identification) technology, which enabled the pavilion's VIP guest to access the top floor. (LIFT Journal 2009).

The Sound in New Media students of Aalto were excited to get their hands into this elevator: the unique sounds of Finnish folk music instruments and pristine northern nature would complete the elevator experience. When the student team presented their ideas to me, I advised them to get in contact with the elevator manufacturer before proceeding with their plan in order to get first-hand information about the actual possibilities to customize the sounds of the lift.

In our next meeting the students reported me what was the response they got. The representative of the company had told that the component, which makes the sound of the elevator, couldn't be programmed to make any other sound. Furthermore, the component is hard-wired into the structure of the elevator in such a way that it cannot be replaced with any other component. So, in the end, the only option for the sounds for the design elevator with hand-crafted ceramic floor and other unique materials and decoration was the same "ping-pong" which is heard in all the lobbies and corridors of office buildings, hotels, hospitals and airports equipped with KONE elevators.

The technical quality of the products – and the quality of the related services – of any internationally successful company must be excellent, and the same goes with KONE elevators without doubt. In summer 2016 I had a chance to discuss with two youngish designers from KONE who were probing the possibilities to launch a major project for upgrading the elevator sounds. In the industry a lot of research-based effort has been put into improving the noise isolation of both the elevator cars and the shafts, but designing sounds is another thing. According to the KONE designers there had been a lot of suspicion about the whole idea: "Have you heard any complaints about our elevator sounds?" was a comment from one engineer.

By the writing of this I don't have further news from KONE about the plans to take a bigger leap in the sounds of their elevators, but I would be very interested to get involved in such design and development.

6. And Get the Machine that Goes "Ping!"

My continuing encounters with artificial signals and my incurable allergy to them brought me recently into conversations with professor Ville Pulkki and research engineer Ilkka Huhtakallio from the Department of Acoustics and Signal Processing in Aalto University. Mr. Huhtakallio had interesting information to share about the beeps emitting from medical devices.

Hospitals and other facilities for medical treatment are semi-public places where patients, their friends and relatives as well as the personnel are being exposed to a very specific array of sounds. Hospital soundscapes would deserve a lot more space in this paper for several reasons, but my motivation to bring the sounds of healthcare devices into the attention of the reader is again in the design aspect. Unlike the branded sounds of smartphones or the anonymous beeps of various gadgets, the audible alarms of medical equipment have been officially standardized³ since 2003. (O'Brien 2007, 1).

Although the specification is voluntary, it is rather likely that manufacturers of medical devices gradually start to take the standard into account – either for liability reasons (i.e. in order to avoid lawsuits in the case of wrong decisions leading to failed treatment) or in order to keep or increase their share of the market. In other words, in the medical equipment business better sound design might be a competitiveness factor. (ibid.)

The heading of this section is a rather famous quote from the film *Monty Python's The Meaning of Life*, which also premiered in 1983 like *Le Bal*. A joke being made out of an alarm signal in both of these films is just a coincidence, but an interesting one considering how far apart the movies are in terms of style and genre.

7. Conclusions and Further Questions

The chirping chips and peeping piezo speakers don't cause hearing loss or physical damage to anybody's ears, and that's probably why these sounds haven't gained more attention in acoustic ecology discourse. As a sonic phenomenon these artificial signals can't be easily categorized as urban or suburban, public or private, hi-brow or lo-brow, nor associated with work or leisure exclusively. Another interesting aspect in the (non)design of these signals is the lack of branding. However, since most of the aforementioned signals are not coming from consumer products, it's actually obvious that the requirements for a successful signal don't include attractiveness. The signal only needs to be loud enough, and as inexpensive to produce as possible.

The ringing tones and other audio signals of mobile phones – and the habits of using them – have changed a lot since the first GSM phones came into the market, partly due to the evolution of technology, but to large extent due to fashion. Especially for the young people being in fashion is important, but even beyond that is the importance of not being out of fashion.

When I asked research engineer Ilkka Huhtakallio about the secret ultimate reason for the use of similar kind of beep in so many different devices, he showed me some pictures

3. IEC 60601-1-8 is a comprehensive international standard that specifies basic safety and essential performance requirements and tests for alarm systems in medical equipment.

and schemes of piezoelectric buzzers and speakers. (TDK Xiamen CO 2008). The speaker is, of course, a physical object, which produces sound waves by vibrating. The special thing about the piezo speaker is that it can be mounted into a quite small space and, furthermore, the fact that it doesn't require any audio signal input to ring. An electric current with a low voltage triggered by a snippet of code – or even just by an on-off switch – creates a burst of a square wave which sounds like, well, a beep. And, as said, the component for making the beep doesn't need much space, it doesn't need much electricity and it's ridiculously cheap to manufacture.

And last but not least, no-one needs to design the sound of a piezo buzzer, it's there, built-in and waiting for just a little bit of AC current to make it chime aloud. The question is whether it would be worth to think of ways how to make space for something deliberately designed instead.

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