TRATTI - Mobile Device Art for Children

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ABSTRACT
In this paper, we describe TRATTI, an art piece that can clearly be characterised as Device Art. It is a funnel shaped bull horn to be worn in front of the belly. Children can walk around with the TRATTI. First, they record their voice into the device. Then, they can point the TRATTI anywhere they want. The TRATTI constantly snaps images from its surroundings and plays back the recorded voice samples manipulted through the image, through the environment. TRATTI is technologically based on mobile phone technology and it reflects a number of key features of mobile phone technology. TRATTI is a loud and disturbing piece of real-time art, a very personal musical instrument playing the voice of the musician, according to her standpoint in the world.

Keywords
Device Art, Retrolutionary, Playing the world, Mobile Instruments, Music.

1.INTRODUCTION
Device is defined as a machine or an invention, which is used to perform relatively simple tasks. Recently Machiko Kusahara, a japanese media art historian and a curator, has defined a new form of media art as "Device Art". "Device Art" integrates art and technology, design, entertainment, and popular culture into the creative process. Kusahara is investigating "Device Art" specifically from a Japanese perspective and cultural history, but her thoughts clearly resonate also with some of the works coming from a western media-art scene. She defines typical characteristics of "Device Art" to be a combination of interaction, application of physical material, custom-made devices and playfulness. Also an affirmative attitude towards technology is another typical feature of the works. "As a concept, Device Art is rooted in the analysis of the key role that devices play in certain types of art, that is, artworks involving hardware (a device) specifically designed to realize the artistic concept. The device itself can become the content. Technology is not hidden, its function is visible and easy to understand, while it still brings about a sense of wonder." She continues arguing that the actual art in the works is the experience what the device offers for its users and the device itself functions only as the "body" of the artwork. The achieved experience obviously cannot be separated from the device, when the device is the means to achieve the experience. Her examples include artist like Toshio Iwai and Maywa Denki.

A good example of artist-created experimental device from western art history is for example Luigi Russolo's (1885-1947) "Noise Intoners". In 1913 Luigi Russolo wrote "The Art of Noises, Futurist Manifesto". In it he writes: "Ancient life was all silence. In the 19th Century, with the invention of machines, Noise was born." In Russolo's view the evolution of music was comparable to the multiplication of machines, which had became part of the everyday life during industrial revolution. In the following year 1914 Russolo introduced his experimental sound-making machines or "noise-intoners", which he had built with his assistant Piatti. These noise machines can be seen as concrete instantiations of ideas he had put forward in his manifesto. In the manifesto (The Art of Noises, Futurist Manifesto) he had claimed that his intention was to research and renew the discipline of acoustics and harmony by introducing a neglected area; the study of noises.

Russolo's noise machines were fairly comical looking sound generators. They were constructed as boxes of different sizes, where each box had a large metal speaker-horn attached to it. The system inside the box was simple; according to Russolo it contained a single stretched diaphragm in the right position, which could create a scale of more than ten notes when tension was varied. Russolo and Piatti were performing several successful concerts with the instruments during 1914. In some of the concerts the noise making instruments were accompanying a classical orchestra.

These new and unique noise instruments were built to enable new kind of sounds and characteristics of sounds to emerge. New kinds of sounds, which were thought to reflect the changing society better than the sounds from the classical instruments. Also the visual appearance of these instruments clearly refers to the age of heavy machinery and industrial production.

A contemporary example of a sound-based device created by an artist is for example Mark Bain's Acoustic Space Gun (2004). This mobile device is a linear sound shifter, which contains a meter long directional microphone and a megaphone shaped sound projector pointed in opposite direction. The device functions as a real time acoustic space shifter meant for use in public spaces. It collects sounds and conversations from far away with the help of the directional microphone and presents them in

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the other direction via the sound projector. It is an absurd spatial megaphone monitoring the space and the crowd and re-projecting the natural acoustic dynamics of location as an echo to another location.

2.A DEVICE WITH RELATION TO ITS ENVIRONMENT

"The soundscape of the world is changing. Modern man is beginning to inhabit a world with an acoustical environment radically different from any he has hitherto known", wrote Canadian composer R. Murray Schafer (1933-) in 1973 in a text "The Music of the Environment". In this text he introduced the term "acoustic ecology", which considers the entire world itself as a musical composition. According to him the blurring of edges between the music and environmental sounds is the most striking feature of twentieth-century music. It became possible to insert any sound from the environment into a composition via electronic recording techniques. The original sound from a source and its electro acoustic transmission or reproduction was separated. In earlier times sounds were always tied to the mechanisms, which produced them. Now any sound could be blown up and stored for the future generations. The sound was split or separated from the maker of the sound and given an amplified and independent existence.

The French composer Pierre Schaeffer (1910-1995), the father of "musique concrete" was following a similar line of interests in the concrete sounds from the environment and in the existence of sounds distinct from their sources. His ideas followed the principles of Edmund Husserl and phenomenology, where sound was inherently considered as separate from its source -a sound as such- and the differences among the sounds themselves were described without considering the modes of its production and transmission.

In 1959 Umberto Eco published his text on music “The Poetics of the Open Work”. He writes: "A number of recent pieces of instrumental music are linked by a common feature the considerable autonomy left to the individual performer in the way he chooses to play the work." His examples from the time include for example, Klavierstuck XI by Stockhausen and Scambi by Henri Pousseur. Henri Pousseur has himself said that; "Scambi is not so much a musical composition as a field of possibilities, an explicit invitation to exercise choice." According to Eco "open" works are characterized by invitation to make the work together with the author, works are "open" to a continuous generation of internal relations which the addressee must uncover and select in his act of perceiving the totality in incoming stimuli and every work is effectively open to a virtually unlimited range of possible readings, which cause the work to acquire new vitality in terms of one particular taste, or perspective, or personal performance.

These few selected examples from the history of audio culture share some similarities; they are concerned with underlying structures and methods, which create the work, and make it interesting and ‘new’.

During the late 1960’s and early 1970’s there were similar interests in structures and systems within the visual arts. An American art critic Jack Burnham published two essays on the state of the art: “Systems Esthetics” (1968) and “Real Time Systems” (1969). His interest was in art, which could be seen operating as a system. He wrote: “Where the object almost always has a fixed shape and boundaries, the consistency of a system may be altered in time and space, its behavior determined both by external conditions and its mechanisms of control.” He argued that conceptual focus rather than material limits define the system. His examples for art, which could be considered a system, were for example Hans Haacke’s art projects which were linked to the environment and used materials like air, water, steam, temperature, etc. Artist Les Levine was also creating art, which was dealing with systems. He stated the following in the late 1960’s: “Many serious artists at this time, are for the most part involved in making art producing systems. The works themselves are not to be considered as art, rather systems for production of art.” This is very close to what Kusahara is arguing about “Device Art”, that the actual art is the experience, which is produced or enabled by the device.

Artist Krystof Wodiczko created Personal Instrument in 1969 for street performances. It was a wearable device, which transformed the surrounding soundscape by manipulating two light sensors in the hands, which were connected to electro acoustic filters located in the soundproof earphones.

One of the new art forms developed during the 1960s was a happening. In her book “Getting Under the Skin” Bernadette Wegenstein writes about 1960s happenings that the concept of simultaneity makes it clear that performance is no longer based on unity, as in traditional theater, but on fragmentation, separation and difference. “What is crucial in this style is the fusion of the product with its creation process and –most important- with its environment.” According to her a performance as a final product is produced simultaneously with its creation process and its environment. In a happening the body became a part of a real-time and real-life process, which functioned as the final artwork. In the 1960s and 1970s performances the body was often used as a political tool and treated as “raw” material, while in the recent performance works –also in many media art works- the body has become a medium itself. This is visible for example in Benoit Maubrey’s experiments with performance and electro-acoustic clothes. In his works the diverse looking clothes or costumes make sounds by interacting with their environment and the user’s body becomes a moving speaker.

Figure 1: TRATTI visually resembles a bull horn worn around the belly.

3.TRATTI, an Instrument

Media Art is full of examples of musical instruments. TRATTI is no exception, nor a revolution in this regard. At first sight, TRATTI looks like an enhanced bull horn, an extended megaphone. It features a giant funnel shaped speaker, a microphone, and it amplifies the sound it records. TRATTI is aimed for children, so it is a fairly small device. It is worn around the belly. Children are free to roam with the TRATTI. They can record sound and point the TRATTI somewhere. Whatever image the camera built into TRATTI receives determines how the sound the kid recorded is played back. Thus, TRATTI is in fact far more than a megaphone. But it plays with their aesthetics, functionality, and social implications.

4.Aesthetics

Traditionally art has been –at least in some parts- dealing with appearance and visuality. Like the examples in the beginning of the text show, an interest in appearances is still visible in the works, but it is no longer fore grounded in them. Especially in the media-/digital-arts one could argue, that the focus of the most of the works is instead in the diverse processes what the work is producing within itself and in relation to the environment, and in the designed systems for these processes to take place. Roy Ascott was claiming in 1993 that there has been a radical shift in how we perceive reality. According to him the emphasis has moved from appearance to apparition, from the visible look of things to the emergent processes of becoming. He defines appearance and apparition in the following manner: "Apparition implies action just as Appearance implies inertia, Apparition is about the coming-into-being of new identity, which is often at first unexpected, surprising, disturbing. If appearance is claimed as the face of reality, of things-as-they-are, apparition is the emergence of things-as-they-could-be."

…

When observing media-art works from recent years, in a fairly large amount of them one can trace a clear tendency for retro-aesthetics or techno-nostalgia. This same could be said about the visuality of TRATTI. Its aesthetic is referring to the past times, to the use of megaphone, simultaneously in its function it has a new emerging identity, which –like Ascott claims- can be unexpected, surprising, disturbing. The character of TRATTI as a device is based on the relationship between novelty and familiarity. Andrew Blake has defined a term ‘retrolutionary’ for things with this kind of characteristic. "Either the old is remodelled so that it can contain the new, or the new is represented as old or traditional. This combination is ‘retrolutionary’ - a word used in the mid-1990s when Jaguar presented the latest incarnation of the XJ series. The car looked like the previous models, but underneath all was hi-tech." (>>)

A traditional megaphone can be thought of as an instrument of amplification or reproduction, while the mouth functions as the place of production. TRATTI is an instrument of both: reproduction and production. It carries the original acoustic message and reproduces it, while it simultaneously separates the sound from the original source and produces a new sound based on the original source, manipulated by the environment.

5.Technology

Though in the end invisible, the design of TRATTI is woven around the mobile phone that builds its centre. The TRATTI exposes its function rather than its workings. These functions reference mobile phone technology; It focuses on vocal sounds, it is planned to get networked, and it is portable. TRATTI is clearly a communication device. And an iconic one. In this regard, TRATTI once more emphasises its status as device art:

»Technology is not hidden, its function is visible and easy to understand, while it still brings about a sense of wonder. Well designed interfaces made of the right materials facilitate interaction for users, often in a playful manner.« (Kusahara, Device Art)

The interface of TRATTI manifests itself in manyfold ways. The piece is worn and thus tightly attached to the body. The direction of the sound is determined by the orientation of the body. The body in the space thus presents the first layer of interactivity. The visual image the TRATTI sees is the second layer of interactivity; By pointing the TRATTI to a specific image, the wearer exercises its influence on the device. All traditional interface elements are left out, leaving no way of directly controlling the device. The vocal input to the device builds the third layer of interactivity; The audio pattern then is manipulated through pointing the device at a

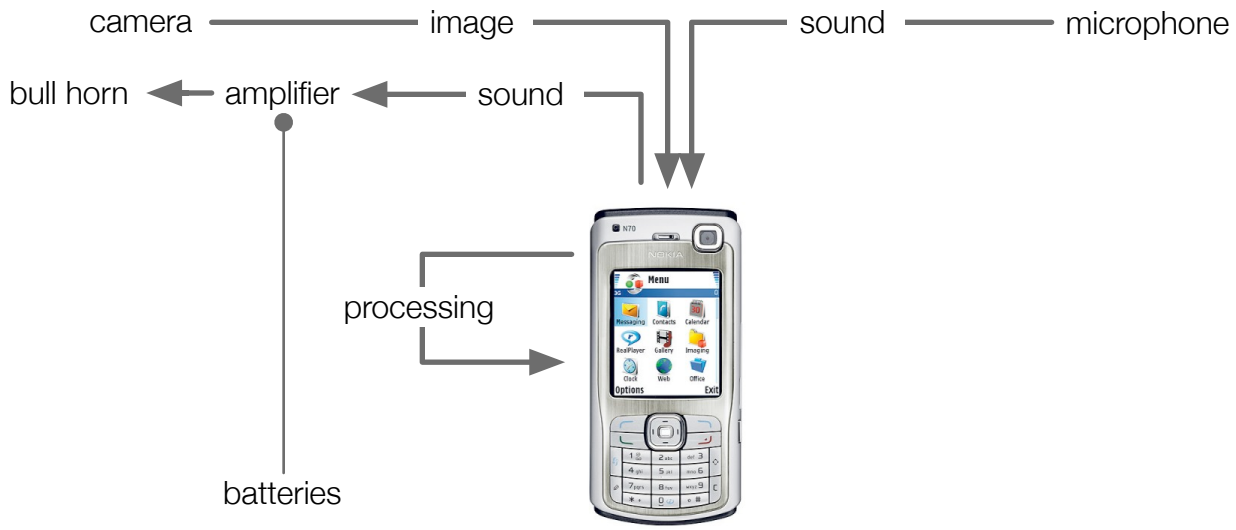

Figure 2: The technical layout of TRATTI

specific image and transmitted in a direction and space determined according to body position and orientation. TRATTI is a device close to your body, close to you.

Just like the mobile phone informed the functionality of the piece, the bull horn determined its iconc shape. These were also our first design decisions: We chose mobile phones as the technological and social platform, and the bull horn as the aesthetic principle. From there, designin the piece was constrained by technical requirements and aesthetic choices. The piece had to be large enough to hold all the technology plus their power sources. At the same time it had to be kept light in order to be suitable for children. Since the weight is felt less when it is placed close to the body, all the heavy parts are in the half sphere right in front of the belly. Of course, the camera image needs to be relayed to the phone. Since the phone cannot be placed at the tip of the bull horn, we had to take the camera out of the phone shell. The same was done with the microphone. The phone speaker was disconnected and the bull horn attached instead. Overall, the whole device can be technically regarded as an enhanced mobile phone.

6.TRATTI as an enhanced mobile phone

TRATTI renders some key aspects of mobile phones visible. The speakers and the camera are enlarged. While visually tine on a normal phone these functions are noticably negatively reflected in public: »Once more, one's right to a certain amount of privacy, even within the public sphere, is being called for, and its transgressions protested at. Do I have to listen to ring-tones and other people's private discussions, although I don't wish to?« (Huhtamo: Hidden histories of mobile media). TRATTI consciously emphasises the base functions of contemporary cell phones.

At the same time, the piece turns these features into interfaces. The microphone is no longer an invisble means of communication. It is instrumental for operating the TRATTI. When the user records her own voice, she communicates with herself as much as with her surroundings. Also, the camera no longer takes images - it is used for modulating the spoken sample. The manipulated sound is amplified and played out loud. This way, TRATTI stresses all socially critical aspects of mobile phones.

7.The making of TRATTI

While taking inspiration from megaphones and bull horns, the TRATTIs themselves are not built out of premanufactured items. Instead, the funnels were custom cast from plastic for the piece. The whole setup consists of several parts: The horn, the half-ball shaped belly, holding straps, the mobile phone, an audio amplifier and speakers, cables, and glue. A diagram explaining how these building blocks play together can be found in Figure 2. The whole system is driven by the mobile phone, running custom software.

The belly is screwed to the horn. Also, the speaker - appropriated from a bull horn - is fixedly screwed into the device. The speaker is receiving its signal from an audio amplifier that amplifies the sound from the phone. The phone's camera constantly records video and outputs sound. The camera, the microphone, and the mobile phone speaker were removed from the phone and replaced by cables sticking out of the phone's cover. Thus, the audio amplifier takes the role of the phone's speakers, the microphone was reconnected at the outside of the TRATTI's cover, and so was the camera.

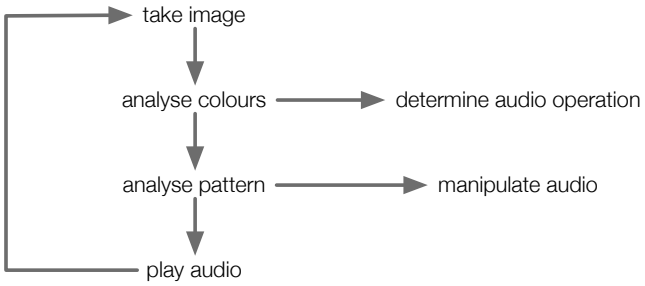

Figure 3: The central loop of TRATTI's software

The software was custom programmed for the piece. It is based on Java and developed in the Mobile Processing environment. It interconnects the different hardware parts of the TRATTI in a very tight way. The whole system runs in a constant cycle (see Figure 3 for schematics). At first, an image is taken by the camera. The image centre is analysed for its colour. The colour determines if the TRATTI records, plays back, mainpulates the audio, or silences. There is a clearly defined mapping between colours and action:

red	> record
black	> silence
yellow	> faster
green	> reverse
blue	> slower

If the colour is red, a new audio file of two seconds is recorded and immediately played. In case of darkness (black), the TRATTI goes silent. The other colours affect the speed, play direction and pitch of the sound. Of course, the colour detection is not 100 percent perfect. Due to that, the piece gains ambiguity and personality.

Additionally to detecting the central colour, the image is analysed for visual patterns. The whole image is first turned black and white. The lighter 50% of the picture's pixels are set white and the darker half is set to black. This yields a black and white image. Any pattern on the image stands out clear after this process. The audio data is manipulated according to the black and white image. For example, horizontal stripes with uniform distances and widths would trigger a "ripple" sound. The exact effect of the pattern on the sound is slightly different for every TRATTI. At the end of each cycle of the software, the processed or freshly recorded audio data is played back.

8.Summary

TRATTI is a retrolutionary (>>Blake) art piece for children. It visually and functionally resembles a bull horn worn around the belly. It is mobile and technologically based on mobile phones. TRATTI is an open art work, making children composers, instrumentalists, and performers. Children can record their voice and carry it around, having it played back in a myriad of different ways according to the environment they scan with the TRATTI.

TRATTI is Device Art and it manifests itself as a personal experience. It operates in real-time and real-space. The piece emphasises the local node of a communication network, the communication device as it appears here and now, loud and disturbing.

9.References

(still missing):

Machiko Kusahara

Luigi Russolo

Mark Bain

Benoit Maubrey

Krystof Wodizcko

R.Murray Schafer

Pierre Schaeffer

Jack Burnham

Umberto Eco

Bernadette Wegenstein

Roy Ascott

Jukka Suominen

Andrew Blake

Cox & Warner

Erkki Huhtamo, Hidden histories of mobile media, receiver