Synesthetic Experience in S T R A T I C

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Abstract

How do we humanize digital interactive technology? One way is through our experience with technology. With S T R A T I C we present several post-digital concepts to discuss the relationship of the digital in regard to our human lives. We emphasize the *synesthetic experience* along with other aesthetic experiences and materiality issues with manifestations of the digital in the physical world, tangible approaches to sonic performances, or exposure of internal logics of technological processes.

In this paper, we propose both exhibiting our work as an art installation and via a live performance. We regard it as being highly relevant to the topic of the TEI Arts Track exhibition: post-digital materiality at the intersection of the analog and the digital, and to its tangible aspects.

Author keywords

Synesthetic experience; post digital; post-digital aesthetics; interactive art; interaction design; audio-visual performance; sampling rate.
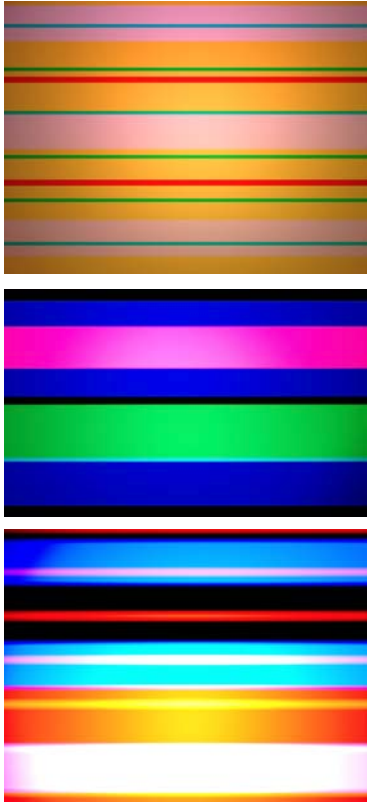
Figure 1. Three still images from the S T R A T I C visuals.

Figure 2. Audio control panel, digital interface.

Introduction

Art-driven research is becoming increasingly important in interaction design and human-computer interaction (HCI) and research that is not problem-driven is finding new ways of conducting research, for instance, by focusing instead on artistic rethinking, reimagining and reinterpreting in comparison to established methods derived from cognitive psychology and computer science. Examples of other approaches are concepts such as ambiguity [15], defamiliarization [3], alienation and uncomfortable interactions [4], aesthetic experience [11], and interaction criticism [2]. In such research the HCI field has borrowed concepts and practices from art theory, philosophy of aesthetics, and critical theory in order to address problems arising as interactive technologies enter into every walk of life. The so-called third wave in HCI is heading towards experiential qualities and shifts from the workplace to more broader and intermixed contexts such as the home, everyday life and culture. It "addresses the topics of multiplicity, context, boundaries, experience and participation" [7].

Recently, audio-visual performances have been receiving more attention and interest in academia (e.g. [13,28]), particularly in the fields of interaction design and HCI that focus more on artistic expression [16,18,24]. Artists exhibit interactive art installations more often and designers demo their prototypes with a focus on aesthetic qualities in conferences such as TEI, ACE, NIME, CHI and ISEA.

The intention of this project is to serve artistic audiences and those interested in aesthetic pursuits and the logics of perception. Thus, the experiential qualities have been strongly expressed. The aesthetic experience with an emphasis on synesthetic experience is discussed below in relation to the post digital.

We want to expand the ongoing discussion about the post digital [6,20] in the arts and materiality research connecting the old and new [9,17], the digital and the physical in HCI [12]. In this domain, art practices and interaction design, as well as theories related to art, technology and science, have been taken into account.

S T R A T I C project

The S T R A T I C project[1] explores the interplay of the sensory actuation in interactive media expression, and the aesthetic properties of analog/digital transformations engendered by the limitations and qualities of various forms of sensing apparatus. The result takes the form of noisy and hypnotic soundscapes linked to an abstract animation (examples in Figure 1). The abstract animation is directly generated from the sound.

This S T R A T I C project is based on the phenomenon that occurs when filming a pulsating light – lines appear on the screen. This phenomenon is produced without any additional computational processes incorporated as the phenomenon happens inside the camera between the pulsation of RGB LED light and the use of the shutter speed and frame rate of a camera. In other words, the sound generates the visuals in real time. The sound is generated digitally and controlled through the digital interface in processing software (see Figure 2) and then sent to a circuit board.

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[1] http://stratic.net

Thus, the thickness and movement of these lines are directly related to the frequency of the sound and of the pulsation of the light in relation to the sampling rate [23,27] of the camera. In this project we explore the interactive potential and the space for aesthetic expression by synthesizing the audio and the visuals.

Project Background
The project is grounded in a form of aesthetics referred to in the art tradition as "avant-garde cinema". *Visual-music* genre originated in the beginning of XX century with silent films in which sound was directly translated into a related visual presentation. In particular, abstract films with their avant-garde experiments, such as Walter Ruttmann's "Opus" series (1921–1925) in which he uses the film medium to expand formalist artistic expression, see Figure 3. In Opus, Ruttmann uses analog film materials to express the dynamics of abstract graphic elements, which are accompanied by music, creating a synchronized audio-visual journey. In Opus IV (1925), it bears a resemblance to the STRATIC of its horizontal moving lines.

Figure 3. Opus IV by Ruttmann.

This project also relates to the futurist art movement of noise music promoting aesthetics that draw directly on machines and their processes. This, in turn, relates to the glitch as an artistic resource and might be perceived in relation to the separation of glitches into *fault aesthetics* and *glitch aesthetics* [25]. This is connected to how Italian futurist composer Luigi Russolo (1883–1947) embraced the aesthetics of noises created by machines and used them for artistic expression by tuning the noises into a polyphony of an "*intoxicating orchestra of noises*".[21] His definition of noise is broad and ever growing as new machines continuously give rise to new forms of noise.

We find interesting parallels between the Modernist tradition and digital culture and its relationship to the post digital [1]. On the one hand, the importance to the whole post-digital condition with references between the old and new [9,17] though, on the other hand, important steps towards the historical foundation of the glitch with the futurist noise approach. The glitch is directly derived from the early art experiments, for example, Magnet TV (1965) by Nam June Paik video artwork, or examples of early avant-garde film editing techniques such as the Soviet Montage Theory of Sergei Eisenstein through formalist and futurist approaches. However, in this work, of course, we align with the digital glitch, which manifests via digital means and is being introduced as a resource for post-digital expression [8].

Mapping concepts of the project
By examining the post-digital qualities of the S T R A T I C project, we employed important concepts, material inquiries, aesthetic decisions and experiences.

Abstraction
In this project, a particular focus has been put on researching the concept of *abstraction* and how abstraction takes place in HCI and the arts field. However, we also see the importance of abstraction in redirecting focus from a displayed content and storytelling to more visual, minimalistic and formalistic presentations, in which more extreme and sensual experiences may arise by examining the ways perception affects our experience.

One example is op (optical) art. Op art employs perception at its best as it explores the visual field of abstract images and creates illusory and imaginary
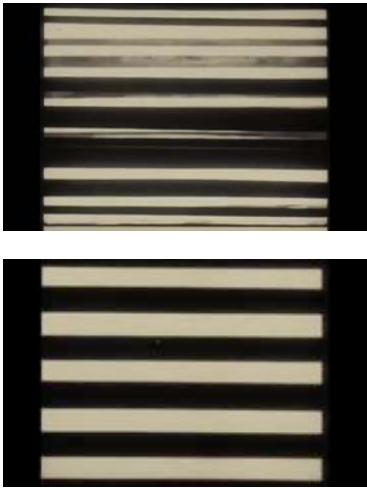
Figure 4. The process scheme of the system.

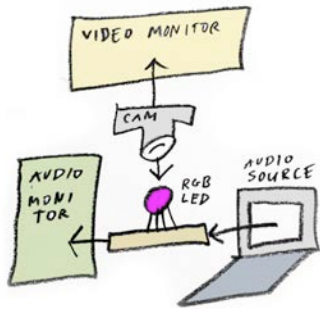Figure 5. Exposure of internal processes of the system.

spheres in which the viewer's vision becomes confused and new visual narratives are created.

The general notion of abstraction relates to the rejection of the representation of realistic and visual references in the world. This notion shifts the focus from the content of the message to the sensual experience and explores the logic of the formal and minimalistic constructs using highly synchronized audio and visuals. This consolidated minimalistic appearance relates to the *synesthetic experience*, in which cross-modal associations create an involuntary physical experience.

Synesthetic experience with audio and video
In the S T R A T I C performances the audience reflected on a highly perceivable synchronization between the visuals and the sound. Such performances affect how the viewers hear the visuals and see the audio as, technically, both these modalities get generated directly from each other. In our project two modalities correlate, however, it is not a limit: "…the stimulation of one sensory modality reliably causes a perception in one or more different senses".[10] The HCI researcher Ilias Bergström also discusses the effects of audio-visual stimuli on the audience in connection with more than one modality and relates visual music and synesthesia with audio-visual perception: "Most relevant to the present discussion is the experience of sound as animated colors and/or shapes".[5]

The experienced synesthesia is a bodily and sensory perception of sound and imagery, in which sound and visuals merge into a single whole and the overlap creates a multi-modal experience. The interconnection between the audio-visual formats is shown through engaging the audience through bodily engagement. In the S T R A T I C installation, sound is perceived through sight while also following the visuals through hearing.

Post-digital bodily experience of sound
Another no less important quality was raised regarding audio when using powerful professional sound systems supporting low frequencies (deep bass) for the performances. This is one of the post-digital qualities discussed by Rasmus Fleischer, 2009, in which digital sound is amplified using a powerful analog system and is perceived through the full-body experience [14]. Following this, the S T R A T I C project embodies the digital dimension by using powerful sound systems, so the whole body physically and bodily perceives digital sound through deep bass frequencies.

Exposure of internal processes
By explicitly escaping the formal laptop performance notion, we should consider Andrews' [1] advice and his discussion on laptop performances through the exposure of processes and the incorporation of physical clues. In this regard, we tried to bring the internal production processes of the S T R A T I C system to be exposed. The devices and processes are made transparent through the *machine aesthetics* approach [22,24] and what is happening on the table is perceivable by the audience. The circuit board with pulsating LED, the process of capturing a pulsating light with a camera is revealed to the audience, and is also shown in Figures 4 and 5.

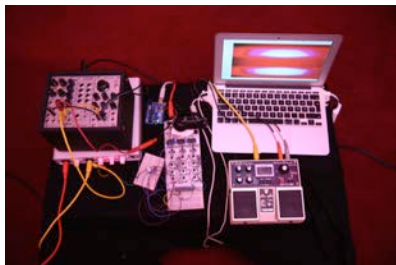The notion of the digital and networks is key to understand the post-digital. We may look beyond the
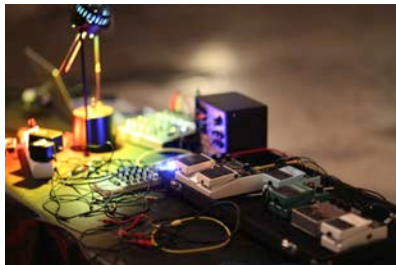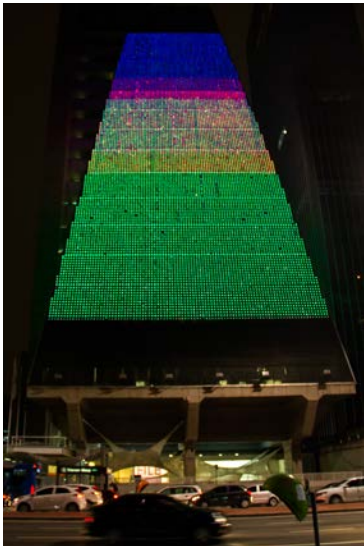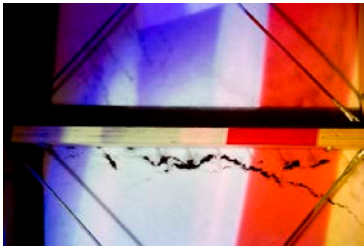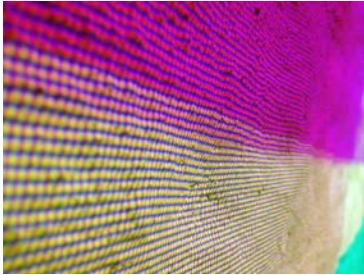
Figure 6. "Digital paintings": top, installation at DKTUS; middle, snow projection; bottom, building screen at FILE festival.

digital through the exposure of its inner machinic processes and behaviors or "an objecthood that incorporates networked digital technologies".[19] This brings us to re-examine the logics of what is going on the production and generative side of the project.

Glitch aesthetics
Returning to the emphasized post-digital quality of technological malfunctioning and its manifestation in artistic works [8], in the S T R A T I C the glitch appears directly from the electrical leaps, through which glitch appearances break the smooth flow of visual lines. This accidental glitch is derived from the electrical charges and appears out of nowhere. Such "glitch approach" refers to *fault aesthetics* [25] principles. However, it is hard to notice a glitch in sonic appearances such as this, as the whole soundscape comprises drone-like music and incorporates many glitch-like sounds.

Manifestations of the video in physicality
Experiments with various screen surfaces caused us to add another layer in our performance and exhibit "digital paintings" [23,27]. The different surfaces examine the notion of manifesting the digital and the glitch in other materialities. Many aspects become evident. For instance, the shape and size of the screen, the materials onto which the projection is beamed, the reflections emerging from the reflective surfaces, and the texture and materials of the screen. All these aspects cause both the digital and the analog to manifest in physicality. The post-digital attribute of the materialization of the digital manifests in the context of projecting the visuals onto various physical surfaces, as well as through hybridization of various formats and forms.

Exhibitions in various contexts
Earlier explorations of the S T R A T I C project have been exhibited at various events and in different contexts from art exhibitions and digital art festivals to conferences. The "digital paintings" (Figure 6) were displayed on various physical surfaces: the rough surface of the wall transformed the projection into a vibrant and wavy movement of colorful lines at the DKTUS art project space in Stockholm. The glass dome building was illuminated from inside by projecting the visuals onto the snow's surface (Dome of Visions, Stockholm). The mega projection of the project was exhibited on a façade of a skyscraper at FILE - Electronic Language International Festival - Fiesp Cultural Center, São Paulo, Brazil, 2016.

Discussion through the post digital
Despite various insights into materiality and discussions of the interrelated concepts, we argue that one of the major implications and take-aways of the project is the *aesthetic synesthetic experience*. Such experience brings a bodily and sensory perception of the sounds and imagery, in which sound and visuals converge into a single coherent whole and create intrinsic multi-modal experiences. The sound is seen and the visuals are heard. Through this process, other modalities of full-body sound experience and exposure of the internal processes are taken into account. The convergence of the digital and analog, the manifestations of the digital in the physical world become part of the same aesthetic experience. We argue that its main relevance is to the fields of both post digital and HCI.

From the start, the S T R A T I C project concerned itself with the limits of human senses at those edges where the boundaries between various formats and

Figure 7. Live performances: top image, Reactor Hall R1, Stockholm; bottom, ACE 2016 conference.

Figure 8. Installation at Open Fields exhibition and conference RIXC 2016, Riga, Latvia.

forms dissolve and new modalities and experiences arise. In the audio-visual performance and art installation, both the audio and the visual work together – to create evocative and extreme experiences. The project seeks to overcome the separation of the audio and the visual. It also draws on convergences of practices and attitudes in order to evoke various sensations.

With this project looking through a post-digital lens we have aimed for the humanization of interactive technology. One way of humanizing digital technologies is through encompassing and relating to our complex and rich cultural capacities. The other way is through the deeper involvement and engagement of our bodies, emotions and experiences with the technologies with which we interact. With this project we have aimed for creating evocative experiences that are at the limits of our human perception.

With such evocative experiences, which manifest through listening to the visuals and seeing the sounds, i.e. perceiving synesthesia, we can relate and inspect the life-logging movement with its "cold" understanding of *numerical aesthetics* and also compare it with other more humane approaches towards quality of life. In this case, our work complements the notion of the post digital with a concept of *qualified-self* by bringing evocative experiences and supporting the notion with more humane qualities and values in our interactions, such as: to cope with the mass of information we generate without the information losing its sentimental value – a form of *qualified-self* instead of the more recognized quantified-self movement.[26]

TEI 2018 The Arts Track proposals
For the TEI Arts Track, we propose an art installation and a live performance. Both could be conducted on their own or in combination.

In the live audio-visual performance (Figure 7) we will use a more complex tool to control the light in order to create more evocative and extreme experiences and compose a show. The performance could take place on a stage, in an art gallery, or in an open space.

In the installation (example in Figure 8), the film of the phenomenon will be screened to share the core of the project – the synesthetic experience – and will function on its own, without the presence of the artist.

Artist
Vygandas "Vegas" Šimbelis is an artist and researcher who combines various approaches in his artistic practice and research. His work is founded on visual, conceptual and media art paradigms, which recently became strongly focused on the technological aspect of new media through the notion of the post digital.

Anders Lundström is a researcher and musician. Combining design and technology is key to his work and he has particular interests in the interaction with abstract data, visual and sonic feedback, meaning-making, and aspects of interactional coupling with technology.

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