INTERACTIVE DIGITAL TECHNOLOGIES
ON SCENE – CONSEQUENCES AND
PERSPECTIVES ON AESTHETICS OF
PERFORMATIVE SPACES

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Abstract: Since the very beginning of electronical assisted performances, like OPEN SCORE (1966) by Robert Rauschenberg, we may identify a very close relationship between digital technology and the aesthetics of the resulting artistic work. More than a simple improvement of technical aspects, e.g. image sharpness, sound quality, interaction with those images and sounds, digital technology impacts strongly on the conceptual interferences between technological and aesthetical structures such as the possible conception of the work itself and the scene design. New possible relations and correlations between the sound, the image, the performer and the spectator open new possibilities to consider time and space in artistic expression, and lead to a new aesthetic grammar, which we propose to define by the notion digital interactive aesthetics.

Even if interactive digital technology is widely used in music, theatre, opera and visual arts, we observe approaches and experiments of new interactive aesthetics including the spectator mostly on the crossborder of installative art and performative works, often proposing a hybrid of both. We try to demonstrate that this new, and still fragile, aesthetics is possible to understand in the continuity of performative and participative art.

Since the beginning of the 20th century, participation and interactivity in arts and performance arts have been a big concern for artists. We can outline a strong conceptual continuity with artists’ critics of new media, and specially the critics of artworks in the context of their relation(s) to the spectator.

Using historical and actual examples of performances and installations using interactive digital technology, we investigate different forms of relations between performativity, time, space and the spectator in the context of contemporary digital interactive aesthetics.

Keywords: Interactivity; aesthetics; performance; digital arts; HMI
1. INTRODUCTION

Interfacing the human body as a user of digital technology increasingly spreads into every aspect of life, at least in its commercialized versions such as in the entertainment industry, in the telecommunication, in the research on intelligent home or medical devices. How does this impact the field of arts, and how does this influence the reception/perception of those artworks?

As there are many analytic angles possible [a], we propose here to conceptualize our analysis from the aesthetical aspects of the artistic interface design based on real-time digital signal processing. Consequently, we’ll treat technical or sociopolitical aspects only if necessary to understand those aesthetic aspects, although they are not completely to separate from each other.

We aim to demonstrate that this new, and still fragile, aesthetics is possible to understand in the continuity of aesthetic preoccupations of performative and participative arts. Furthermore, we hope to contribute to the conceptualization of this aesthetic grammar, which we propose to define by the introduction of the notion digital interactive aesthetics.

2. AESTHETIC ASPECTS OF INTERACTIVITY

Focusing on aesthetic aspects of interactive technologies in the context of arts, we identify two main theoretical approaches in the discourse about media and interactive media:

Firstly, the position suggesting that art is continuously «in search of technology», as Gregory Whitehead [1] was stating it in opposition to his vision about radio considered as «succeeding only in devouring itself». By extending his thought about sound and radio art to arts in general, could we assume the interfering process between arts and the underlaying use of technical processes and devices as a in search of technology-process in which every new technique substitutes and/or devours the preceeding one?

As if, using the 19th century as a starting point, we would trace continuity from industrialized oil painting techniques, which allowed the impressionists to paint outdoor, towards photographic techniques, which radically changed artists’ practices, to the later developements from electrical,
e.g. Duchamps/Tingely, over electronical, e.g. the emergence of synthesizer in music, to digital devices used in arts, e.g. the emergence of the computer.

Secondly, to consider interactivity as a « possibility to create a virtual space of imagery wherein a three-dimensional structure of relationships between these images can be defined. This structure then constitutes the form of an interactive space in which the viewer can move about. », as Jeffrey Shaw [2] wrote about his own interactive works. A conception, where sounds and visuals in interactive dispositions, including generative creative processes, were conceived as content that we could actualize, reactivate or where we can navigate in.

In our sense, these two conceptual axes are emerging from two different aspects of digital interactivity: on the one hand from the applied digital technique, and, on the other hand from the way we can operate with this technique, and in the case of generative processes, how we can let this technique operate. So we could state that the matter of the reciprocal relation between technique and aesthetic in digital interactive works emerges by questioning: what makes the digital interactivity work? Much more than a question on technical aspects of interactivity, it does open towards a much wider conception than just moving, and/or moving within, an interactive space.

2.1. Interactivity: what and who moves whom and what?

The design of interactive dispositif like sound and visual installations, musical instruments and interactive settings on scene is nowadays based on real-time digital signal processing. What is the role of the interfaced human body on the intersection of this collected and/or generated data?

As sound, visual or body centered performances have different approaches to conceive form as well as different concepts of re/presentation, are there correspondences between these art forms, and may we understand the body then as a recontextualizer, like a mediator between the different artistic contexts? The body of the performer, and, in case of its inclusion, the body of the public as spect-acteurs [b], recontextualizing the given visual, sound or physiological i.a. data on symbolic, epistemic, aesthetic registers?

To reduce the body to a mere user agent in a relational data structure would reduce finally, as we assume, the human aisthesis, the human perception and the human sensation in the context of arts. To introduce the concept of interactive and relational experience in digital interactive aesthetics a step further, we will analyze shortly in art history some aspects of the
relation(s) between the artist, the spectator and the artwork.

2.1.1. **Semantic reference frame of experience**

In the 1960s, in the so called artists movement “Wiener Aktionismus” (Viennese Actionism), Austrian artists [3] expanded the visual arts as well as the emerging media arts to body centered performance, an artistic practice implying a wide variety of experiences including psychological, sociological, political, gender and media aspects.

In a gender critic of media concepts and contexts Valy Export defines her performative work *TAPP UND TASTKINO* (Touch-cinema, 1968) as the first film « *of and with and about a woman* » [4]. In the public space, Export fixed a box on her upper body, which front, covered by a curtain, exposed her naked breast to the spectator, nothing to manipulate than the exposed breast of the artist. But, on the spectators’ side, all the systems of signs regarding the social and political condition of women in all aspects of society are questioned on the base of this touch. Without any technique applied, we see here how participation operates already as a semantic reference frame of experience.

How does this semantic reference frame of experience work on stage, when electronic technics come in? We shall outline constitutive aspects of this issue by considering the example of the work OPEN SCORE (1966) by Robert Rauschenberg [5].

For the performance *OPEN SCORE*, Robert Rauschenberg experimented in 1966 different state-of-the-art technologies, in an armory specially adapted for the *9 evenings*. We will only mention here some of the elements necessary to point out our reflexion on the integration of the spectator.

A tennis court was installed, an audience of about 500 people seated around it. Two small groups of the audience were placed on each side of the tennis net. The performance started with a tennis game between two performers, a man (Frank Stella) and a woman (Mimi Kanarek). Their tennis rackets, equiped with a contact micro and a tiny FM-transmitter integrated in the handles, were emitting by wireless radio transmisson the vibrations of the racket cords, a bong-like sound. Each bong corresponded to a switch off of one of the 48 lights illuminating the tennis court, till the complete darkness, performers making themselves visually vanish [c].
In the second part, in this complete darkness, the audience was invited to enter the court and to execute 10 gestures from a list provided to them by Rauschenberg, such as *move close together, man wave with his jacket, move apart, hug somebody, sing one of the given songs etc.* Infra-red cameras captured their actions, transmitted on three screens in front overhead of the audience. By moving around the tennis court, they felt where they were, but could not see exactly where they were, on the end all people were standing nearby each other. The people could not see each other directly, only feeling each other, seeing themselves only on the projection screens.

The audience is here an integrated part of the piece on at least two levels: part of the cast, and as such indispensable to the specific aesthetics and structure of this performance, and by their actions part of the active and passive part of the *aisthesis*. Observation and perception are held separately here, but conjoined disposed in presence, observation and perception *mediated* by the technical couple infra-red camera + projection. The spectator *performs* within a given aesthetical structure, and in the same time perceives the *aisthesis* of his performance, being able to observe and perceive, or selects only one of the two statuses. In Rauschenberg’s *OPEN SCORE* we see aesthetic elements and conceptions at work, bringing together contemporary art and state of the art electronic technology of his time, and pionneers by this conceptual structures of - future - digital interactivity.

### 2.1.2. Spectator and experience

While in the *TAPP UND TASTKINO* the experience is lead on the individual basis, in *OPEN SCORE* the experience is individual and collective. In Valie Export’s case of individual setting in a public space, we observe one more aspect of inclusion of the spectator: the passive observer of an active participation, which could be / become active participation, by acceding to the place of participation. We understand this place as an oscillatory point of access, where the status may change from active to passive or in between. Consequently, interactivity is not reducible to navigation through and with data, but it is an operating system of conditions and statuses in the semantic reference frame of experience.

And this is where interactivity as a system of *aisthesis* reveals to be poetical and political, in losing its innocence. Consequently the spectator loses equally its innocence by assignment and discernment. We consider this
loss as processes of active, passive as well as *in between* choices of various degrees of freedom.

The human body and the associated body theories are determinant in the conception of such aesthetics, in a variety of ways, such as a link, as a surface, as an object, as an subject and so on. There are some structural elements underlaying his roles. We will focus next on those underlaying structures in regard of the body in physical interaction.

### 2.2. The interfaced body

In actual projects taking recourse to computer assisted artworks and scenery, motion tracking, generative digital processing like image and sound synthesis, sound and visual spatialization in real or virtually augmented space are major preoccupations in technical/scientific as well as in artistic research [6] and in the collaborative field of art and science. We conceive the body, as interfaced body, in the center of those preoccupations.

### 2.3. Conceptual modalities for physical interaction

The artistic interface design based on real-time digital signal processing is considering data on different levels and to different extents, as well as foresees interacting with those data on different levels and to different extents. As we are in this paper treating the technical aspects only in the background, we shall discern next the main conceptual modalities of interaction.

The term interaction in computer science was borrowed from the social science in the sixties, referring to the capacity of the computer to *react* to the user. In social science, the term defined a reciprocal relation between the actions [7]. This terminological borrowing reflects in our sense most of the metaphors used in human machine relationships, like the machine as an extension of the human body, man machine hybrid forms till the transhuman, or the human body becoming obsolete through the machine. These metaphors are echoing between arts and science, e.g. in the work of the artist Stelarc. Concerning digital interactive aesthetics, we would like to emphasize here on structural relations, and identify two major types of relations: the external and the internal relations. The external relations define the status of the spectator within the artwork, the status of the artist within the artwork, and the status of the artwork itself. The internal relations define the status of digital
processes operating, e.g. generative sound. When a spectator interacts via a tangible interface, or is captured by a light sensor starting a computational process with his movements, and is as a result, for example, visualized on screen, focalizing on this action-result vectoral coupling misses the spectator’s experience as such.

As a spectator, experiencing *during* (as *during in presence*) this action-result connotation opens to the *aisthesis* involved. It is at this precise moment, a *TimeSpace*-based moment, that dramaturgical, scenographical, choreographical elements come in, which determines the relations and levels of interaction mentioned earlier. Diversity, complexity, degrees of freedom, participative structures till the co-creation through the spectator, linear or hypertextual narratives, net-work and non-figural structures, all these different artistic practices and strategies are held by the internal and external relations build between the spectator, the artist and the artwork. Then digital interactive aesthetics go beyond automatisation, regulation and calculation as its heritage, beyond transmitting the invisible and visible between inscription and memory, constituting the data-body. At this precise *TimeSpace*-based moment latent power becomes imminent, alike the « *latent power of theatre* » as described by Peter Brooks [8]. We may extend this to performative digital interactive artworks and to the latent power of digital interactive aesthetics.

### 2.4. Presence and its importance in digital interactivity

Performance, as an artistic practice, is peculiar with regards to its use of time and space due to its constitutive ephemeral form. The *present* time of its duration, is also – maybe mainly – the time/the duration of a relation between the performer and the spectator, considered as a time/a duration of an action, of an invitation to act, of an invitation to an experience.

In this present time, considered as a time of experiencing, the spectator is not a mere observer, but an involved observer. This involvement that can be graduated in intensity relies on the attention, an attention that involves the performer as much as the spectator. The attention is in the present while an intention can arise also from the past or/and be directed towards the future. The performance is inscribed in the « *duration at present* » (in differentiation to the *duration of the present*, as well as to symbolic time structures that may be used throughout a performance). It is an action, a process inscribing its duration in the time of the present, which does not get replaced by another time (past or future) in favor of narrative purposes.
This time of presence is intrinsically linked to the space of the performance, (meaning the performing space here). A performing space that is not restricted only to the juxtaposition of two spaces: the performance space confined as stage reserved to the artwork on the one side and the auditorium space confined exclusively to the public on the other side.

The space of performance is a shared space. The performers’ space and the spectators’ space intertwine and interfere with each other, leading to a performative time-space weaved up by the will of the artist, his provocation, his incentives, opened to share experience.

This outlined present time does not coincide with the real-time as a specific notion of digital interactive works. On the aesthetics levels real-time does not substitute to present time, nor is it indispensable for experiencing present time. Real-time is one of the constitutive elements of digital interactivity for his intern structures, and may be, but not imperatively, an aesthetical element.

3. EXPERIMENTS ON DIGITAL INTERACTIVE AESTHETICS

In our artistic research work, we investigate different forms of relations between performativity, time, space and the spectator in the context of contemporary digital interactive aesthetic.

We will take our project transcordonse [9] as an example. The aim of this project is to create an interactive time-space in dialogue with the public. A choreographic, sound and visual environment designed both as an interactive performative installation and as a choreographic environment for a performance. The use of strings as interfaces allows structuring the performance space like an open scenic space. An interface like a sculptural object, offering to the user, to the public as user as well as to the performers as users, the choice to interact through the strings made interactive by sensors. Moving the strings generate various interactions like the recording of movements, the processing and the diffusion of digital sounds and images in real-time. Structures of different size and numbers of strings have been explored.

The priority was to research how the interactive environment could be structured starting from the body and its movements, and how the interactivity generated from this device would allow the construction and the perception of
sounds and images. Furthermore to introduce the experience of sound and images linked to movement. More than an encounter with the resemblance of oneself, the body’s movement finds its interferences and its reflections multiplied and fragmented in the movements of the images and the movements of the sounds, introducing a perceptible presence of the body, through and with the different media used, including the silence and the emptiness like the absence of the active body.

Figure 1. transcordanse #1, performative installation 2006; Museums Quartier Vienna (A)
(a) view of cords structure (b) view of second projection

In this choreography of bodies and data, structures of relationships will be established between the body and its visual and sound environment. The spectator shares his interactions with other spectators, he may be watched meanwhile or he may stay on the outside, but he remains part of the environment that includes the choice of non-action as a form of implication. Transitory trajectories, choreographic relations between real bodies and virtual data bodies as a multilinear experience, an open socio-choreography.

Figure 2. transcordanse #2, performance and performative installation 2010; Kabelwerk, (A)
4. QUESTION THE SCENE IN THE FRAME OF DIGITAL INTERACTIVITY

Contemporary artists' practices in the presently discussed field, but not only, are blurring the lines between established categories such as installation, performance, visual art, theatre, dance, opera, music production and so on, going beyond usual settings in black box, white cube, public space or intermediate strata. To question digital interactive artworks, and consequently digital interactive scenery emphasizing on examples on the crossborder between installative art and performative works, as well as hybrids of both, leads us to reconsider the unstable, fragile character of digital interactive aesthetics in the continuity of aesthetic preoccupations of performative and participative arts since, at least, the beginning of 20th century, as demonstrated here.

Stage productions are under the pressure of various constraints. One of the major constraints in regard of digital interactive aesthetic concerns the conventional stage/Fourth Wall dispositions what allow only little adjustments of the public focus point. The design of open space audience settings like described in the examples, with flexible spaces as principle, is a big matter since the emergence of experimental theatre and performative art, it is reappearing strongly regarding digital interactive aesthetics. Some productions try to circumvent this by using only the stage as a shared space for performers and public, using specific screen settings, and eventually by doing so, create virtual or augmented spaces, or by performing in adapted venues like black boxes or white cubes, or in public spaces.

To deal with this specific space/stage circumstances, to create specific open, versatile and transmittant space settings as well as relevant time settings is an integral part of the constitutive principles and elements of digital interactive aesthetic. That means going further then the appropriation and application of new technical procedures in conventional venues, it means to foster reciprocal influences between technical and aesthetical procedures.

This continuity of aesthetical experimentation, including non-linear and non-figural aesthetics, differs in our sense from traditional forms of representation, and underlines the inclusion of the double analysis in the fields of art and science, as well as in the fields of consistently renewed non-conventional artistic practices. The dramaturgical conventions of the Fourth Wall are called into question again, driven by interdisciplinary approaches.
linked to the digital, in the interwoven relationships between arts, sciences, individuals and society.

6. **CONCLUSION**

We aimed to point out the historical context in which interactivity inscribes itself in arts, and from another angle of analysis, to underline the historical context in which interactive arts inscribe themselves in artistic practices, and in consequence interactive arts inscribe themselves in the aesthetic discourse.

Beyond current disambiguities of the reconstruction of reality as augmented reality, virtuality of any kind, and the echoing alteration of our definition of reality, echoing also in the interstice between art and life, as well as resonating in the tension between the private and public sphere, digital interactive aesthetics is inscribed in a *time-space discourse* by those artistic practices, and furthermore, in the continuity of critical media studies, in a political discourse.

To conclude, we want to emphasize the unstable statuses between the artist, the artwork and the spectator: the artist is no longer the exclusive author of the artwork, the artwork is not freezed in its form, nor is the spectator.

**NOTES**

[a] Many worthfull approaches cannot be treated here because beyond the scope of this paper, but stay open for our current and future research.

[b] *spect-acteur*. Neologism proposed by Jean-Louis Weissberg, by contracting the terms spectator and actor in french language: *spectateur, acteur*.

[c] Was finally executed manually due the impossibility to realise it technically as foreseen by electrical impulse.
REFERENCES


[5] OPEN SCORE by Robert Rauschenberg, part of the innovative experiences between art and science in 1966, known as 9 Evenings: theatre and engineering, the «first one to one collaboration between artists and engineers», cit. Billy Klüver. DVD; edited by EAT and ARTPIX; www.9evenings.org;


[9] transcordanse is a series of interactive installations and choreographic environments, carried out since 2005 by Helmuth Reiter, www.extendedmovement.cc