Self-surveillance and Self-perception in the Digital Arts

Raivo Kelomees
Estonian Academy of Arts, Tallinn, Estonia
raivo.kelomees@artun.ee

Abstract

The viewer is inside the work. The viewer is in front of the work. The viewer is reflected in the work. The viewer as an object of self-manipulation. In each of the projects discussed in this paper the viewer is either reflected in the work or is an object to be manipulated in it: the viewer is either visible directly as an image or becomes the object of the work's transformation. Projects that utilize the viewer's own image have become increasingly relevant as they offer a thread by which we can trace the history and development of the digital selfie in more recent artworks. Projects that deal with the self-surveillance and self-perception of the viewer can be seen to function at various degrees of complexity, from relatively unintrusive mirror-like environments to works that attack the integrity of the personality.

Keywords

Self-surveillance, self-perception, interactive art, digital art, social interaction, dialogical artwork, digital mirrors.

Introduction

Self-surveillance and self-perception in the digital arts

The reflected image is probably the most compelling and oldest format of an interactive work based on real-time feedback. The viewer sees their own reflection in the work, providing real-time feedback for manipulating the image as far as the technology allows—from portrait to full-body feedback image. Such a looping situation whereby material first introduced into a technical system can then be re-introduced and reproduced has deep roots, but it only really became possible with advances in technology and increasing operational speeds. An artist using an initial drawing as a base material for subsequent drawings may suggest a similar kind of feedback situation, at least conceptually, but it is materially distinct from electronic processes.

One of the compelling features of feedback-based works is that they enable the viewer to come into contact with a distorted self-image, an experience not unlike the experience of seeing oneself in a distorted mirror. Such works also provide a kind of 'mirror' in so far as they present or 'reflect' the viewer's own image back at them. The origins of these technological artwork-mirrors can be traced back to the centuries-long tradition of artist self-portraits and also the use of mirrors in architecture.

Among the artworks that exhibit characteristics of mirrors and interactivity are the video-based works of the 1970s. These works often comprise installations and performances that utilize video-recordings and include many of the earliest instances of artists attempting to present the reflected self-image using real-time technology. After first getting to know the technology of the video medium in the studio, the next step is to present that same game of self-exploration in the exhibition hall, where the audience can instead become the viewer and object of the feedback games. The results are the so-called 'video-feedback' works. Relatively simple works whereby the viewer simply sees themself or can play with the image of their own body or face can be included in this category. The following exemplify this kind of work: Peter Weibel's *Observation of the Observation: Uncertainty* (1973) and *Kruzifikation der Identität* (1973); [1] Dan Graham's *Yesterday/Today* (1975), *Opposing Mirrors and Video Monitors on Time Delay* (1974/1993), [2] *Present Continuous Past(s)* (1974) [3] and *Time Delay Room* (1974); Bruce Nauman's *Live-Taped Video Corridor* (1970); [4] Bill Viola's *He Weeps for you* (1979); Peter Campus's *Interface* (1972); [5] and Frank Gillette's *Track/Trace* (1972). [6]

In most of these works, the either viewer's image is distorted, altered or the viewer has to somehow manipulate the image object of the installation in order to produce a self-image. In Weibel's *Identity Crucifixion*, the viewer must raise their hands to shade the light-sensitive elements before their portrait will appear in the middle of the crucifix. In Dan Graham's work *Present Continuous Past(s)*, the viewer's image is fed back to them via a monitor screen only after an eight-second delay. Seeing oneself on a monitor after that short delay creates an uncomfortable, alienating experience of both space and self. In Nauman's work *Live-Taped Video Corridor*, the viewer approaches their image along a narrow corridor with a monitor located at the other end, but as they approach the image becomes smaller. In Bill Viola's *He Weeps for You*, the viewer sees themself reflected in a drop of water as it periodically falls onto a drum placed on the floor, causing a loud clatter and shattering the viewer's reflection.

All these works of the 1970s were innovative in exploiting feedback in the form of the viewer's own image. However, while they already exhibit an essential characteristic of interactive art, the viewer's direct influence on and reflection in the work and the electronic technology is utilized in a rather primitive way and so they can hardly be described as 'interactive'. Compared to later forms of interactive art, the viewer in these works is not an active or willing participant, something which becomes increasingly important in later works where the participation of the viewer is enabled with the assistance of digital technology and sensors.

Feedback imagery is of course a very wide topic, not only in respect of the output image but also in relation to the input material. Works that play with feedback can produce imagery that appears entirely detached from the source object while the overall visual procedure may itself be in a constant state of change due to the feedback loop. In the numerous versions of Nam June Paik's *TV Buddha* a statue of Buddha sits facing its image on a TV screen and the general situation remains constant. In contrast, in Paul Prudence's work *Talysis 2* (2007) we see a continuing metamorphosis of geometric lattice modules reminiscent of Op Art, where video feedback creates "auto-catalytic self-generating" works of art. This is done in software: a simple square goes through a series of transformation operations, creating a mosaic-like grid. [7]

Signal looping is a method employed in several Steina and Woody Vasulka videos from the 1970s that use homemade video synthesizers. In these works the input is an ordinary street scene, but the electronic intervention breaks down the image into an abstract tapestry where the flowing dynamics of the scene are preserved but the mimetic, recognizable image is lost.

Feedback, as a cybernetic principle, can be an object of observation in itself. It is the basis for the functioning of both living organisms and technical systems, as was first formulated by Norbert Wiener and Julian Bigelow as early as 1942. There is also a comprehensive book of more than a thousand pages, *Closed Circuit Videoinstallationen* by the German researcher Slavo Kacunko, that is dedicated to the study of "closed-circuit video installations" in media art. [8]

Already in the early days of video art the importance of the medium for enabling real-time observation and new kinds of perceptual games was noted. Gene Youngblood emphasized this in his 1970 book *Expanded Cinema*:

> "*The self-feeding, self-imaging, and environmental surveillance capabilities of closed-circuit television provide for some artists a means of engaging the phenomenon of communication and perception in a truly empirical fashion similar to scientific experimentation.... I use the term teledynamic environment to indicate that the artist works directly with the dynamics of the movement of information within physical and temporal parameters. The physical environment is determined by the characteristics of the closed-circuit video system. The artist is concerned not so much with what is being communicated as with how it is communicated and the awareness of this process. Thus television becomes the world's first inherently objective art form."* [9]

Youngblood's term "teledynamic environment" refers to the process taking place in a feedback situation, where the important thing is the ongoing procedure rather than the communicated content.

At this point in the discussion it is important to draw a line under the kind of interactivity we are looking at. Earlier I referred to simpler interactive works that can be thought of as 'pre-computer' interactive works and environments and it remains important to keep these in mind when thinking about the broader development of the art form. They can be understood as inspirations for the later developments, even to the extent that later projects have sometimes tried to be copy them by reproduction in digital technology. That reproduction approach corresponds with a broader media-archeological trend in media art, not only in the sense of its 'upgrading' kinetic and video works to digital media, but also as a peculiar kind of aesthetic paradigm, which we can see in the works of Toshio Iwai, Paul DeMarinis or Gebhard Sengmüller. These artists have all consciously and sometimes ironically made digital works and emulations of 19th century toy boxes, early telegraph ideas and 1980s slow-scan television.

Söke Dinkla, the author of one of the earlier approaches to interactive art, wrote in 1997 that the use of computers should be considered a key criterion for the identification of all interactive art: *"The term 'interactive art' is a category-based definition of computer-based works in which interaction takes place between a digital computer system and users."* [10]

In contrast, Katja Kwastek considered the interaction of viewers with the work to be defining feature: *"Interactive art places the action of the recipient at the heart of its aesthetics. It is the recipient's activity that gives form and presence to the interactive artwork, and the recipient's activity is also the primary source of his aesthetic experience."* [11]

The element of interactivity is of course essential. In the following examples I aim to observe the further limitation, such that the use of computers and digital technology will be the criterion for the selection of interactive that follow here. However, we should note that our idea of a "computer" has changed over the past few decades—interactive installations can now be been made with controllers that are readily available and tiny by comparison to those of the 1970s, such as Arduino or Raspberry Pi—and today it is not beyond the power of computer engineers working in collaboration with artists to design the controller themselves and have a bespoke board printed.

Myron Krueger's projects, beginning in the 1970s, may be considered pioneering interactive digital works of self-observation and self-perception. These works can distinguished as two distinct types of installation in which the viewer sees their own silhouette: 1) those in which the image is connected only to computer-based visual components; and 2) those in which the viewer co-participates in interactive image games with another person. In the first type, the visual element forms a symbiosis of real-time image and digital image. In the second type there is a com-

petitive and playful interaction of two silhouettes each formed by distinct elements of the installation.

The story of the inception of these works is remarkable. Krueger worked as a computer engineer and made the first prototypes for a television company that wanted a visualization aid to assist weather forecasters in presenting their forecast. [12] Krueger called his projects 'responsive environments' in an article of the same name *Responsive Environments* (1977). [13] In the article he acknowledged the collaboration of artists Dan Sandin, Jerry Erdman and Richard Venezsky at the University of Wisconsin, in his first project *Glowflow* (1969), in which viewers could create synthesizer music by pressing fluorescent pillars in the installation space. Krueger's article is itself pioneering. In it he offers an early definition of the term 'interactive art', which would not become a trend and buzzword until the 1990s. He also defines the idea of human-machine interaction and makes practical suggestions for the use of such systems in education, psychology and psychotherapy.

In the text, Krueger presents further ideas that remain relevant today: that the computer acts like the conductor of the orchestra, with the artist being the composer of the score, in a performance that requires both player and conductor. However, unlike the composer of a piece of music, the artist creates a number of possibilities that the performer may not actually use. [14] In this regard Krueger's text is particularly interesting, as it has since become commonplace in interactive art that the work "*can and does offer more*" than the viewer either wants or understands how to use. Experienced artists have gradually learned to make simpler and more focused projects that only do one thing. This phenomenon can be observed even in painting: works with a single clear idea tend to communicate more effectively to the viewer.

Few works can bear comparison with Hieronymus Bosch's *Garden of Earthly Delights*, which contains dozens of eloquent elements. The viewer is overwhelmed by the detailed work because it is not for viewing but rather for reading. It is the same with media artworks that employ lots of details—excessively complex and open projects tend to cause confusion and anxiety in the viewer—and this fact is especially true in today's information-rich era, where the viewer has themselves to do some work just to receive the art. There follows an expectation that the work will then communicate unambiguously, directly, and without burdening the viewer with superfluous information.

In his 1977 article, Krueger describes in detail the work *Videoplace* (1974-, Figure 1), which is intended as a communication between two spaces but also involves a number of subversions. The two spaces can be located in the same building, but also in different regions of the planet. So, it is a telecommunication installation. Viewers see each other's past images on a shared screen. [15] Once again, it is an exceptionally innovative work, since there were practically no telecommunication art projects in the 1970s.

Figure 1. Myron Krueger *Videoplace* (1974-).

Writing about the use of interactivity in psychotherapy, Krueger writes that a responsive environment can create a safe and trusting relationship before the psychotherapist interacts with the patient. It seems that the patient trusts the impersonal technical environment over the real person, and even in later moments of uncertainty may return to the safety of the "responsive womb" that is the technical environment. [16]

In the 1980s, feminist artist and filmmaker Lynn Hershman Leeson made a series of innovative multimedia projects when the term was not even widely used, including *Lorna* (1979-1983) and *Deep Contact* (1984-89). These works enabled the viewer to interact with on-screen content, in the latter case directly by touching parts of the image on the screen. The touch screen must have been experienced as a near-miraculous technology at that time, but Leeson's *Room of One's Own* (1990-3) is the more emotionally touching work for the viewer. The work allows a view into the small room of a lonely woman, and in that room the viewer discovers their own eye looking out from a TV screen.

David Rokeby's *Very Nervous System* (1986-1990) is one of the first in which the viewer/participant's physical movement becomes itself an instrument for making music. The work uses cameras, image processors, computers and synthesizers. Music is created by movements of the viewer's body in front of the camera. It has been presented both as an installation and as a performance in public places. [17]

Rokeby is known for introducing the term 'interactor' to denote a new type of participant in interactive art—a significant contribution to later discussions about the changing situation of the art viewer. [18]

Christian Moeller's *Electronic Mirror* (1993) is a liquid crystal screen that blurs as the viewer approaches it, making the viewer's image invisible. [19] In this work, a kind of beautiful paradox is expressed, that in order to see yourself better you have to move away from the screen. Some parallels can even be seen here with Bruce Nauman's work *Live-Taped Video Corridor*. There, too, the viewer's expectations are 'deceived': approaching the object, the im-

age does not improve, but the work shrinks the viewer's reflection to a point where it is barely visible.

Similar to Moeller's project are two works made decades later—*Blur Mirror* (2016) and *Fragments* (2016) by the Random International art group. Both are based on installation panels made of mirrors. *Blur Mirror* consists of tiny mirrored squares and the viewer's reflection is blurred as a result of the micro-vibration of these squares. [20] In the work *Fragments*, the camera follows the movement of the viewer, again the surface of the installation panel consists of about two hundred tiny mirrors that turn towards the viewer, creating a funnel-like or wave-like three-dimensional form on the plane. The authors see the situation as a lifeless object—a responsive mirror installation—becoming alive, resulting in a dialogue between human and non-human behavior. [21]

Romy Achituv and Camille Utterback's *Text Rain* (1999) is a variation on what we have previously seen in Krueger's installations in that the viewer's image is combined with computer-generated real-time imagery. Here letters fall upon the image of a person, either missing the figure or stopping on it. As the title says, it is text rain. By skillfully striking poses, the viewer can collect letters to form words. The text itself is taken from poems that reflect physicality and language. The spontaneous choreography created by each viewer is unique, and the participants experience a certain excitement. As the number of participants increases so the cooperative game becomes more fun and continues for longer. Of course, you could also stand beneath the rain of letters holding an umbrella. [22]

Scott Sona Snibbe's *Deep Walls* (2002) plays with the image of the viewer on a wall of sixteen screens. As the viewer moves in front of the wall the system records the different moments of his movement. Viewers can also watch recordings of previous visitors on the screens. The author calls it a "cabinet of cinematic memories". In terms of interpretation, there are several layers to the work. The author has written that the work was inspired by the surrealist filmmaker Jan Svankmajer, the Quay Brothers and the surrealist sculptor Joseph Cornell: in their films and sculptures, small objects and figurines are placed in obsessive collections that characterize psychological and spiritual states, while the rational process of organizing exposes the unconscious irrationality. [23]

One group of works is characterized by the reduction of the viewer's image to a symbolic object. This can be seen in Carl-Johan Rosén's work *Predator* (2006, Figure 2) and Togo Kida's work *Move* (2005). In Rosén's work, the viewer is reduced to a square that is attacked by another square—a 'predator'. The game requires the viewer to escape from the predatory square. When the predator and viewer overlap, the viewer's square disappears—the viewer is 'eaten'. A similar game of chasing and dodging and takes place in Kida's work. The project consists of six different modules: 'jump', 'avoid', 'chase', 'throw', 'hide' and 'pick up'. In the 'avoid' module, the viewer must avoid the red circle that attacks him.

In order to understand works like these, the viewer has to engage somewhat primal instincts to flee or avoid capture. It could be said that it is superfluous to discuss the artistry of these works, since they require such basic responses from the viewer. Shouldn't a work of art be more intellectual? These works are metaphorical games, a fundamental representation of a certain struggle between objects, and with a 'tracking' dimension. If one wants to place these works into a wider context then we can think of the global surveillance space where we are tracked by numerous data collection technologies.

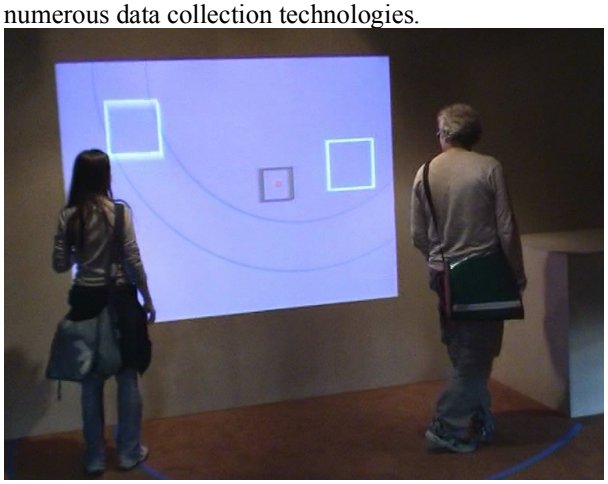

Figure 2. Carl-Johan Rosén *Predator* (2006).

We can see the use of the image of the viewer's whole body in a work by Tmema (artists Golan Levin and Zachary Lieberman), *Messa di Voce* (2003). [24] This work was originally a performance where animated images and ripples around the bodies of voice actors were triggered by the sounds of their voices—volume and pitch could be used to influence the animations. This solution was later adapted to the installation format in the museum environment, so that using their voice regular visitors could change their silhouette or a playful visual projection instead of their body image (Figure 3). Again, Krueger's installations can be considered an archetype for this work, whereby the viewer's distorted silhouette is captured by the computer in reflection games.

Figure 3. Tmema (Golan Levin and Zachary Lieberman) *Messa di Voce* (2003).

Analogous examples include Chris Milk's *The Treachery of Sanctuary* (2012), where the viewer's silhouette is replaced by that of a bird and the viewer becomes that bird by waving their hands. [25] Daniel Rozin's projects, of which *Trash Mirror* (2001) was among the first, is suggestive of the mirror panels described earlier (Figure 4). [26] Although they are a reflection of the viewer's image and silhouette, Rozin's projects contain a fascinating paradox. *Trash Mirror* does this by bringing physical, tactile matter into play, namely the motorized modules that rotate to create the image are made of materials with a physical identity—wood, tufts of faux fur, glass, etc. In addition, the video image is itself mirrored: the left and right sides are swapped. Although it is not intended to be touched, when the non-tactile image is placed in a tangible material its appearance becomes distinctly tactile. There is thus a contradiction in the moving image being made tactile while the image itself remains essentially non-tactile.

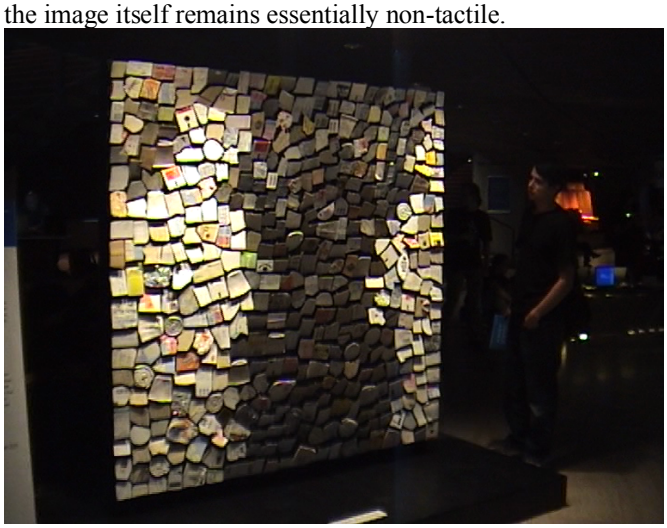

Figure 4. Daniel Rozin *Trash Mirror* (2001).

In other words, the most compelling aesthetic experiences in digital art are built on experiential paradoxes: the tension between what is inside the image and what is outside the image, tangible and imaginary, corporeal and ephemeral, living and lifeless. Artworks that affect viewers the most include archetypal experiential layers, and the advantage of interactive art over traditional art forms is its ability to include the viewer's own movement in real time (and related kinesthetic and proprioceptive feeling) so that gestures, the sense of touch, even aromas, may be at play, not to mention auditory or visual modalities.

Certain works of art are more like scientific experiments or have been developed in cooperation with, for example, neuroscientists, affective-computing researchers, curators and designers. Tina Gonsalves's *Chameleon* (2009) is based on a programmed algorithm that can read the emotion expressed in the face of the viewer as they enter the installation. The installation then chooses a video clip that represents that same emotion. For the viewer, the installation is realized as soon as they enter the exhibition space and find themself surrounded by an orchestra of faces that reflect their own emotional state. As the viewer's facial expressions of emotion changes, so does the emotional tone of the gallery.

Chameleon investigates emotional contagion: how we automatically adjust our expression according to the 'emotional background' of our surroundings, and how we reflect and imitate others' gestures, tone of voice, posture. Simply, the project investigates how we conform emotionally. The project has also received some interest from scientists, as the movement between facial expressions that is prompted by the work can provide a basis for further experimentation and study of emotions. [27] The classic experiments of this kind relied on a database developed by Paul Ekman in 1970. That database records static images that express six basic 'pan-cultural' emotions: happiness, sadness, rage, fear, surprise, and disgust. On the Ekman group page, it is still possible to participate in paid micro-expression training based on the database static photos. [28]

In the same category of works dealing with facial expressions and emotions, Alexa Wright's *Alter Ego* is of particular interest. [29] In this work, the viewer sits in front of what appears to be a mirror, but is actually a digital screen that presents a 3D synthetic image of the viewer's face—an 'alter ego' that begins to imitate facial expressions. The image is a real-time computer animation based on twenty-two ready-made face modules from which the system chooses and then combines with a scan image of the viewer's face. [30] The imitation image is somewhat clumsy and chunky, and the viewer's experience is thus weird and even horrifying. [31] The image is both familiar and strange, but it is also readily understood that it is trying to achieve similarity. The author and his colleagues have discussed the idea in the broader context of human subjectivity, digital game theory and psychological research. They are also seeking some insight into the question of whether machines are capable of imitating human emotions and whether machines can meaningfully communicate with people. In terms the project's practical application outside the art world, the authors also refer its potential for use in research into bi-polar disorder, and in the training of people with autism or Asperger's syndrome to recognize and interpret facial movements. [32]

Wright's and Gonsalves's projects exemplify the potential of art works for mutually beneficial engagement with scientific research and art projects. *Alter Ego* is a collaboration with Professor Alf Linney of University College London. However it is interesting to note that unlike descriptions of the works in art contexts (such as an exhibition catalogue) that typically refer to the scientist as a collaborator only in the body of a text, in the science context published articles give equal footing to scientist and artist, setting them both out as co-authors.

The projects we have discussed so far are characterized by a 'reflection' of the viewer appearing in the work, or the

viewer's image being the primary object of manipulation—that is, the viewer is visible directly as an image or symbolic marker. In contrast, Masaki Fujihata's *Unreflective Mirror* (2007) does the opposite: the viewer is erased or rather in the 'mirror' feedback image only the stereo glasses worn by the viewer remain. This kind of disabling and cancelling is only really effective in a context where it defeats the viewer's expectations.

In many of the previous examples that involved a virtual return of the viewer's own image we can talk about the return image being distorted in some way. I would call this a 'filtered image' or 'altered image'. It is an image that has been enhanced by the computer system, either in a positive or negative sense: something has been added to or something has been removed from the viewer's mirror image. The viewer's reflection in the interactive work has thus been manipulated, distorted and influenced. Sometimes these distortions are only of the face, sometimes of the whole body, and so the viewer's experience of themselves in these works will differ depending on whether the games are limited only to the face, or whether kinesthetic and proprioceptive experiences are also involved—i.e when the whole body comes into play.

These experiences clearly distinguish interactive art from more traditional art formats where bodily movement is not a decisive characteristic of the work. Of course, one can also speak of a kinesthetic experience in video installations where the viewer sees their own reflection only after a delay, as for example in Dan Graham's installations. That delay is enough to cause an experiential shift. While the viewer can only influence the image by moving in space, the 'experiential shift' occurs as a certain failure in movement and inhibition in the viewer's body. Of course, this is a subjective interpretation, but I think of this as the 'return' of the mirror image to the viewer.

Our understanding of ourselves is never based solely on the experience of ourselves as inhabiting our body, but also on how we see our body from a distance, either as a reflection in a real mirror or as an image on a screen, and the feedback we get from the social environment. It thus becomes *a body image* that is both visual and evaluative, psychological and social. One way or another, this distant reflection is nonetheless experienced as within and an essential character of our body. If this image is disturbed, in the sense of temporal or plastic distortion, then, understandably, a conflict arises between the previously established self-image and the disturbed feedback image. What then happens for the viewer will differ for each individual. At one extreme of the axis of experience, it is just another source of aesthetic experience, while at the other it can be deeply traumatic.

In interactive works, the passive reception of a disturbed reflection is accompanied by the possibility of actively influencing it. Sometimes this allows the viewer to adapt to this new distorted image, to put it on like an oddly constructed coat. Even where the feedback image seems repulsive or destructive, there remains the possibility of cooperation, for creation and adaptation that can eliminate potential disharmony.

The terms *body schema* and *body image* are apposite in this context. A body schema is an image of one's body that is constantly being created thanks to tactile**,** kinesthetic and optical raw materials. It depends on the individual person, their personality, emotions, and the actions. The body schema can also be disturbed in healthy people, influenced by, for example, drugs. Disturbances in the body schema also occur in certain psychiatric and neurological disorders.

However, body image (or also *concept*) is a subjective image of one's body, especially in relation to the assessment of it by others. Disturbed body image is the basis of several neurotic addictions, of which anorexia nervosa is probably the best known. [33]

The concepts of *body schema* and *body image* are useful terms, for example, when looking at surrealist art such as the paintings of Salvador Dalí or the drawings and dolls of Hans Bellmer. However, these concepts also make it possible to understand interactive body based or body image reflecting and distorting installations as provocations and distorters of body schema and body image. By nature, the body schema and body image are each plastic. As the sensory and psychological raw material from which the scheme and image are derived changes, so the way one knows and perceives one's own body also changes. In this way, body-based interactive installations enter the existing region of psychological manipulation of self-perception. The viewer's imagination has already been there, asking the viewer questions about the social projection of their body and unconsciously perceiving its objective limits. This plasticity of the body schema is also illustrated by examples of surrealist art. The stretched limbs and hypertrophic body parts of Salvador Dalí's paintings are like illustrations of serious psychiatric or neurological disorders.

That it is possible to both imagine and materialize this image is an example of the plasticity of body schema and body image in the imagination. This can also be ordinary everyday experience. Most of us will have experienced riding a bicycle or driving a car, and in doing so we have subjectively adjusted the dimensions of our bodies to accommodate the combined bodies—me+bicycle, or me+car in order to safely navigate the road and avoid collisions with other bodies obstacles. In this way the body schema adapts to other objects with which it becomes related.

Finally, I turn to a few examples that illustrate interactive projects involving self-image at a level of sophistication where the viewer's image or gaze remains important even while the distinction between the viewer and the work is practically eliminated. If in the previous examples the viewer was confronted with a technical system that provided visual, auditory or objective feedback based on their own image, in the following two examples there is no confrontation with the object. Instead, the technical system

enables a merging of multiple viewers. There is an exchange of bodies or perhaps an exit from one's own body, and so a kind of perfect 'work of being inside a work of art' is realized. That said, the following projects are perhaps closer to psychological experiments in perception.

International research group BeAnotherLab is engaged in the study of illusions and the promotion of empathy. Their experiment consists of 'swapping bodies'. The participants, usually two, wear VR helmets that display the subjective viewpoint of the other person. The participants not only see themselves through the eyes of another, but by directing their gaze down toward their legs, feet, hands they each see the other person's body as if it were their own. It thus becomes possible to experience yourself as more slim, bigger, male, female and so on. [34]

Our second example is Steven Maher's project *Overhead*, which offers the viewer the opportunity to see themself from the perspective of a camera some metres above their head and attached to them by a helmet. This disembodied perspective allows the viewer to see themself as a distinct object placed in the environment, a little like a drone's view. [35] This project was demonstrated by Maher at the *Wild Bits* exhibition in July 2018 in Estonia.

For these projects, the concern is not so much participation and interaction as the technical transfer of the viewer's gaze to outside the viewer's body. These projects contribute to the experience of de-personalization and create a situation where the distinction between the viewer and the art object practically disappears. These projects also serve to extend the human experience. BeAnotherLab in particular offers an exercise in empathy that brought tears to the eyes of some participants. [36]

In summary, the category of projects discussed in this article exemplifies works defined by engaging with self-surveillance and self-perception, and where the artwork acts as a mirror that enables the viewer to experience themself in both passive and interactive ways. The criterion chosen to select these works is the presence of the viewer's own reflection, or an image that imports the viewer somehow into the work. These works enable viewers to manipulate, play, co-create and interact with their image or its substitute. The actions of the viewer join the material and object body of the work into a performative whole, offering the possibility for an object-event to emerge.

The discussion here runs along an axis where at one end there is a passive object, such as a simple mirror, that is not itself an art work—although it allows the viewer a great deal of play with their own image. The mirror is also a charged object, culturally and historically, in and of itself. There have been numerous analyses and conceptual proposals written about the use of mirrors, and it is common to find the object used the works of artists through much of art history.

At the other end of this axis, we have interactive 'mirrors'—works that allow the viewer to participate in games that manipulate their own image. We have seen that some degree of interactivity and distortion of the viewer's reflected image is evident even in apparently non-interactive video installations—such works may be considered historical precursors to properly interactive self-perception projects.

In many works that present interactive mirrors, we can also see the distortion of the viewer's reflection. This *filtered image* or *altered image* returns to the viewer and can become a source of novel or enhanced experience. The experience itself is built on an experiential shift, the basis of which is the *body schema*, the experience of the integrity and controllability of one's own body. This integrity and verifiability is called into question by the installation and is also connected to *body image*. In fact, in some cases it is not possible to distinguish which 'body' the work of art is about: the psychological-neurological, characterized by a body schema; or the psychological-social, described by a body image. The work can function on both levels, and go as far as to engage for the viewer an experience of de-personalization and/or de-realization. Of course, for a work to provoke such a profound response in the viewer, either that person must be exceptionally receptive or the work of art must be unusually power in its function. Fortunately, this author is not aware of any examples so extreme that the work has caused psychiatric problems for the viewer, although theoretically it is possible. In this regard we can also refer to works of Op Art, some of which are exhibited even today with a label warning that the work may cause dizziness, loss of balance, vomiting, and is a greater risk for children, old people, pregnant women and people who suffer with vertigo, for example. That is to say, some works of art can still do cause objective psychological and physiological reactions.

We have seen how these works, related to self-monitoring and self-perception, operate at various levels of complexity and immersion, from simple mirror-like environments that offer little interaction to more sophisticated environments may assault the integrity of the viewer's personality.

References

[1] Peter Weibel, *Kruzifikation der Identität,* accessed March 10, 2024, http://www.medienkunstnetz.de/werke/krucifikation/

[2] Dan Graham, *Opposing Mirrors and Video Monitors on Time Delay*, accessed March 10, 2024, https://www.sfmoma.org/artwork/93.78.1-7/

[3] Dan Graham, *Present Continuous Past(s),* accessed March 10, 2024, http://www.medienkunstnetz.de/works/present-continuous-pasts/

[4] B. Nauman, *Live-Taped Video Corridor*, accessed March 10, 2024, http://www.medienkunstnetz.de/works/live-taped-video-corridor/

[5] P. Campus *Interface*, accessed March 10, 2024, http://www.medienkunstnetz.de/works/interface/

[6] Frank Gillette, *Track/Trace* 1972/2017, accessed March 10, 2024, https://www.youtube.com/watch?v=3xmolbrRTZo

[7] P. Prudence, *Talysis 2*, accessed March 10, 2024, https://www.transphormetic.com/Talysis-II

[8] S. Kacunko, *Closed Circuit Video Installations. Ein Leitfaden zur Geschichte und Theorie der Medienkunst mit Bausteinen eines Künstlerlexicons* (Logos Verlag Berlin, 2004)
[9] G. Youngblood, *Expanded Cinema* (Clarke, Irwin & Company Limited, Toronto and Vancouver, 1970), 337-339.
[10] S. Dinkla, *Pioniere Interaktiver Art* (Edition ZKM Karlsruhe, Cantz Verlag, Ostfildern 1997), 8.
[11] K. Kwastek, *Aesthetics of Interaction in Digital Art* (Cambridge: The MIT Press, 2013), xvii.
[12] Heard in the spring of 2000 in Helsinki at Myron Krueger's lecture in connection with the conference organized as part of the exhibition *Alien Intelligence* (curator Erkki Huhtamo).
[13] M. Krueger, *Responsive Environments*, Proceedings of the 1977 National Computer Conference, New York, USA (1977), 423-433, accessed March 10, 2024, http://raley.english.ucsb.edu/wp-content/Engl800/Krueger-AFIPS.pdf
[14] M. Krueger, *Responsive Environments*.
[15] M. Krueger, *Videoplace*, accessed March 10, 2024, http://www.medienkunstnetz.de/works/videoplace/ ; http://dada.compart-bremen.de/item/artwork/1346
[16] M. Krueger, *Responsive Environments*.
[17] D. Rokeby, *Very Nervous System*, accessed March 10, 2024, http://www.davidrokeby.com/vns.html
[18] D. Rokeby, *Transforming Mirrors: Subjectivity and Control in Interactive Media.* Critical Issues in Electronic Media. Ed. by Simon Penny (State University of New York Press, 1995), 133 – 158 .
[19] C. Moeller, *Electronic Mirror*, accessed March 10, 2024, https://christianmoeller.com/Electronic-Mirror
[20] Random International *Blur Mirror*, accessed March 10, 2024, https://www.random-international.com/blur-mirror-2016
[21] Random International, *Fragments*, accessed March 10, 2024, https://www.random-international.com/fragments-2016
[22] Romy Achituv and Camille Utterback, *Text Rain*, accessed March 10, 2024, http://camilleutterback.com/projects/text-rain/
[23] S. S. Snibbe, *Deep Walls*, March 10, 2024, https://www.snibbe.com/projects/interactive/deepwalls/
[24] Tmema (Golan Levin and Zachary Lieberman), *Messa di Voce*, accessed March 10, 2024, https://vimeo.com/25037133
[25] C. Milk, *The Treachery of Sanctuary*, accessed March 10, 2024, https://vimeo.com/25037133; http://milk.co/treachery
[26] D. Rozin, *Trash Mirror*, accessed March 10, 2024, http://www.smoothware.com/danny/newtrashmirror.html
[27] T. Gonsalves, N. Berthouze, M. Iacobini, *The Chameleon Project*. Second Nature, Issue No. 3, March 2010 , 138-163, accessed March 10, 2024, https://static1.squarespace.com/static/604b30fd987d8e384effc81e/t/60d13ca78f3976687356402a/1624325313011/secondnature_gonsalves.pdf
[28] Paul Ekman Group, *Micro Expressions Training Tools*, accessed March 10, 2024, https://www.paulekman.com/micro-expressions-training-tools/
[29] Alexa Wright, *Alter Ego*, accessed March 10, 2024 https://www.alexawright.com/alter-ego
[30] Alexa Wright, *Alter Ego*, accessed March 10, 2024, https://vimeo.com/212579581
[31] The term 'uncanny' comes from German articles, the prototype of which can be considered Sigmund Freud's essay *Das Unheimliche* (1919). However, this was preceded by Ernst Jentsch's 1906 essay *On the psychology of the uncanny* („Zur Psychologie des Unheimlichen"), which states that strange means doubting whether a moving being is really alive or, conversely, whether an inanimate being can also be moving.
[32] A. Wright, Shinkle, E., and Linney, A., *Alter Ego: Computer Reflections of human Emotions,* In Proceedings of the 6th Digital Art Conference , 2005, https://www.researchgate.net/publication/228711360_Alter_ego_Computer_reflections_of_human_emotions (viewed 10. III 2021).
[33] A. S. Reber, *Dictionary of Psychology* (Penguin Books, 1985), 99.
[34] BeAnotherLab, accessed March 10, 2024, http://beanotherlab.org/home/work/tmtba/
[35] S. Maher, *Overhead*, accessed March 10, 2024, http://www.stevemaher.net/Overhead
[36] V. Woollaston, *The goggles that let you swap gender: VR headset allows wearers to experience the world through the eyes of the opposite sex*. MailOnline, 18 February 2016, accessed March 10, 2024, https://www.dailymail.co.uk/sciencetech/article-3452591/The-goggles-let-swap-GENDER-VR-headset-means-wearers-experience-world-eyes-opposite-sex.html

Biography

Raivo Kelomees, PhD (art history), is an artist, art historian and new media researcher. He studied psychology, art history and design in Tartu University and the Academy of Arts in Tallinn. He is senior researcher at the Fine Arts Faculty at the Estonian Academy of Arts and professor at the Pallas University of Applied Sciences. Kelomees is author of *Surrealism* (Kunst Publishers, 1993) and article collections *Screen as a Membrane* (Tartu Art College proceedings, 2007) and *Social Games in Art Space* (EAA, 2013). His doctoral thesis is *Postmateriality in Art. Indeterministic Art Practices and Non-Material Art* (Dissertationes Academiae Artium Estoniae 3, 2009). Together with Chris Hales he edited the collection of articles *Constructing Narrative in Interactive Documentaries* (Cambridge Scholars Publishing, 2014). In collaboration with Varvara Guljajeva and Oliver Laas he edited the collection of articles *The Meaning of Creativity in the Age of AI* (EKA Press, 2022).