The Art of the Interface in Mixed Realities
Predecessors and Visions

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Abstract

The approach of this paper is broad and historical; it attempts to expand a narrow technical view by looking at historic art media together with contemporary media art. By focusing on recent art against the backdrop of historic developments, it is possible to better analyze and grasp what is really new in media art and, using cornerstones from the history of media of illusion and immersion, it is a material and theoretical contribution to a new, emerging discipline: the science of the image. Where and how does the new genre of virtual art fit into the art history of illusion and immersion in the image, that is, how do older elements continue to live on and influence this contemporary art? What part does this play in the current metamorphosis of the concepts of art and the image? For example, the influence of Mixed Realities and their interfaces, where a new blend of traditional media is created through combining architecture, sculpture, painting, and scenography.

Bildwissenschaft – Science of the Image

Rudolf Arnheim's recently published article, *The Coming and Going of Images,* is an impressive plea for integrating the new, interactive, and processual worlds of images into the experiences, insights, and riches which have come down to us from past ages in their works of art.[1] At no other time in history has the sphere of images produced by humans changed at such a breakneck pace, never before were people exposed to so many and so different image worlds, never before has the way in which images are created changed so radically. In our time, we are witnessing the transformation of the image: it is rapidly becoming a computer-generated, virtual, and spatial entity that appears to be capable of changing autonomously and represents a total, life-like, visual, and sensory sphere. Temporal and spatial parameters can be changed at will so that virtual spheres can be used as models or simulations for gaining certain types of experience. Global access to images via the Internet coupled with the techniques for enabling telepresence have opened up new options for sensory perception. In addition, large sections of our natural surroundings have been declared an image resource and amalgamated with artificial images to produce so-called Mixed Realities, where it is, in many cases, almost impossible to distinguish between simulacrum and original. Today, in a finely meshed alliance between science and art, media art explores the aesthetic potential of interactive, processual image worlds. Well-known representatives of virtual image culture, such as Maurice Benayoun, Monika Fleischmann, Masaki Fujihata, Seiko Mikami, Simon Penny, Jeffrey Shaw, and Christa Sommerer and Laurent Mignonneau, work both in basic research and combine art and the natural sciences in the service of today's most complex technology for generating images. Media artists work in very disparate areas, which include robotics, telepresence art, bio-cybernetic art, space art, experiments in nanotechnology, artificial life (or A-life) art, fractal art, design of virtual agents, data-mining, mixed realities, and database-supported art. Perhaps the most important areas are telematic art, genetic art, and immersive-interactive art, which are all collected under the heading of *virtual art*. Thus the greatest challenges facing contemporary artists can be defined as interface design, the opening up of complex options of action, and thus of experience as well, for the user, and experimentation with the new and shifting constraints of human dealings with the everchanging machines and systems.

This dynamic process of change has fueled the interdisciplinary debate about the status of the image, which has been ongoing now for about ten years.[2] The new media, and particularly the new art produced with them, pose this question more urgently and with a new quality. The projected new discipline of a "science of the image" consciously discards old notions of specifically "artistic" images. In this regard, it refers back to Aby Warburg's early ideas on a science of the image oriented on cultural history, Erwin Panofsky's "new iconology," or the studies on vision by Norman Bryson und Jonathan Crary. Whereas in the past, studies and analyses on the concepts of the image were almost entirely to be found within the province of art history, research in this field has increased exponentially in psychology, aesthetics, philosophy, cultural studies, visual studies, natural sciences, and computer science. Particularly in art history, the oldest discipline concerned with images and media, the question of the status of the image has once more become a virulent issue; a remarkable parallel to the racing speed of developments in the field of the new media and their worlds of images. At the moment, to employ an expression of Walter Benjamin's, it has got "the wind of the world's history in its sails." The emerging science of the image is a fruitful addition to the scientific history of artistic visualization[3], a history of science in art and images, as proposed by Bruno Latour und Martin Kemp[4] or the recent U.S. American foundation of a *science*

[1] Rudolf Arnheim *The Coming and Going of Images, LEONARDO*, Vol. 33, No. 3, pp. 167-169, 2000.

[2] See: FREEDBERG, David. 1989. *The Power of the Images*: Studies in the History and Theory of Response. Chicago: Univ. of Chicago Press; BELTING, Hans. 1990. *Bild und Kult*: Eine Geschichte des Bildes vor dem Zeitalter der Kunst. Munich: Beck; CRARY, Jonathan. 1990. *Techniques of the Observer*: On Vision and Modernity in the Nineteenth Century, Cambridge, MA.: MIT Press; MITCHELL, William J. 1995. *Picture Theory: Essays on Verbal and Visual Representation*. Chicago: Univ. Chicago Press; ELKINS, James: The Domain of Images, Ithaca: Cornell University Press 1999; MANOVICH, Lev. 2001. *The Language of New Media*. Cambridge, MA: MIT Press.

[3] KEMP, Martin. 1990. *The Science of Art*: Optical Themes in Western Art from Brunelleschi to Seurat. New Haven CT: Yale Univ. Press, SOMMERER, Christa, and Laurent MIGNONNEAU, eds. 1998a. *Art@Science*. New York: Springer.

[4] LATOUR, Bruno. 1996. Arbeit mit Bildern oder: Die Umverteilung der wissenschaftlichen Intelligenz. In: Der Berliner Schlüssel: Erkundungen eines Liebhabers der Wissenschaften, ed. B. Latour, pp. 159–190. Berlin:

of the image, where the focus is primarily that of the natural sciences[5]. On our way toward a science of the image, Maurice Benayoun transports us in *World Skin* to a virtual battle panorama, which the user experiences interactively through CAVE technology. Placed like Potemkin villages, soldiers of many countries and epochs are arranged in a kaleidoscopic pattern in a theatre of war and death. In *Murmuring Fields*, Monika Fleischmann and Wolfgang Strauss create a virtual space of philosophical thought, which stores statements by the philosophers Vilém Flusser, Paul Virilio, Marvin Minsky, and Joseph Weizenbaum, and is experienced as a Mixed Reality. Jeffrey Shaw places visitors to his *Place Ruhr* installation on a rotating platform where they view panoramas of industrial landscapes in the Ruhr, Germany; places that are monuments to a passing age. From automated search engines for images on the web, Christa Sommerer and Laurent Mignonneau generate a sphere of spatial effects in a CAVE in their work *The Living Web.*

Predecessors

Although many people view the concept of mixed realities as a totally new phenomenon, it has its foundations in an unrecognized history of immersive images. In addition to the artists and their works mentioned above, one could also cite works by Luc Couchesne and Mark Naimark, amongst others. Whether consciously or unconconsciously these artists all refer back to a historic ancestor in the history of art and the media: the *panorama,* patented in 1787. Originally conceived as a new mode of visualization for purposes of military reconnaissance, Robert Barker's invention with its circular perspective was very soon marketed and, in the course of the 19th century, became a mass medium that reached several hundred million people. On the changing terrain between art, spectacle, and political propaganda, at first panoramas were painted by single artists, working alone in years of hard and painstaking work. By 1800, in the capitals of England and France, panoramas were being produced by teams of painters whose work was organized according to strict economical principles and the division of labor, that is, industrial processes, in a matter of mere months. The panorama marks the combination of art, science, and technology in an image medium for the 19th century and it was one of the most widespread image media in art history.[6]

The suggestive power of immersive image spaces was not only recognized and utilized by politics on a mass-media scale, but also by the church in pursuing its strategies of power. The most famous illusion space at Sacro Monte, the *Calvary*, was created in 1518–1522 by Gaudenzio Ferrari, whom his contemporaries put on a par with Raphael, Michelangelo, and Leonardo *(Ill. 1)*. The style of his early work was characterized by manneristic delicate grace, but in Varallo the proportions of Ferrari's figures change for greater realism, his palette glows with natural colors, and some of his life-size, terracotta figures wear real clothes, have real hair, and glass eyes. This technique of representation creates the illusion of fusing a colorful, three-dimensional foreground of figures — a variety of *faux terrain* — with a two-dimensional fresco in the background. Proportions, colors, and particularly the artist's dramatic and highly emotional, even ecstatic, representation of events send out a forceful appeal to the observer. In this work, Ferrari is completely in agreement with contemporary art theory, which viewed mental fervour (*moto: Lomazzo*) in particular as the basis of artistic creation. At night, the chapels were lit by torches, which further enhanced the illusion of living impressions. This example of a Mixed Reality used all means available at the time to create the deception of real presence with the effect that the monks, who guided the pilgrims around the complex, were constantly obliged to remind the visitors that this was not the real Jerusalem. It was so successful that in the following years a whole series of *Sacri Monti* were constructed and opened, not least with the aim of erecting an *image wall* against the approaching Reformation. These media dinosaurs then spread from Italy to France, Portugal, Spain, Mexico, and finally, even to South America.

Ill. 1: Ferrari, Sacro Monte di Varallo, 1518-1522.

The idea of merging physical space with a space of illusion goes back at least as far as classical antiquity, to the wall paintings in Roman and Pompeiian villas, such as the *Villa dei Misteri*, but this is certainly not the starting point of this lineage of images; nor is the evolution of media of illusion or immersion its end. In this chamber dedicated to the cult of Dionysos, used by his followers for rites of initiation and other rituals, the visitor stands surrounded by painted life-size, realistic figures, who appear to address him/her and also each other, wall-to-wall communication across the intervening physical space. This image space functions rather a lock on a canal: it allows gods and mythical beings to pass through into the physical space and, in the other direction, like a modern Mixed Reality, leads human actors and observers onto the same image level. This strategy of immersion, which again is executed here with the maximum of media means available at that time, also "opens up" the boundary with the image space, integrates the observers in the scene, and conducts them towards the central ritual of the mystery cult — the state of being emotionally, even ecstatically, engaged and absorbed. History has shown that there is permanent cross-fertilization between large-scale spaces of illusion that fully integrate the human body (360°frescoes, the panorama, Stereopticon, Cinéorama, IMAX cinemas, or the CAVEs) and small-scale images positioned immediately in front of the eyes (peepshows of the 17th century, stereoscopes, stereoscopic television, Sensorama, or HMDs).[7]

Immersion is produced when art work and image apparatus converge, or when the message and the medium form an almost inseparable unit. Then, in a moment of calculated "totalization", the art work, for a limited time, permits conscious perception to become unconscious illusion. Looking back over the argument, the enduring aim of the immersion principle is to force the illusive

Akademie Verlag; KEMP, Martin. 2000. *Visualisations*: The Nature Book of Art and Science. Berkeley: Univ. California Press.

[5] http://web.mit.edu/I-m/

[6] BORDINI, Silvia. 1984. *Storia del Panorama*: La visione totale nella pittura del XIX secolo. Rome: Officina Ed.

[7] Cf. GRAU, Oliver: Virtual Art: From Illusion to Immersion, Cambridge: MIT Press 2002 (in press)

medium beneath the viewers' perception threshold, and thus to maximise the conveyed message's intensity. The medium becomes invisible. Immersion is undoubtedly key to any understanding of the development of media, even though the concept appears somewhat opaque and contradictory. Obviously, there is not a simple relationship of "either–or" between critical distance and immersion; the relations are many facetted, closely intertwined, dialectical, in part contradictory, and certainly highly dependent on the disposition of the observer and his/her media competence, which has grown in the course of history. Immersion can be an intellectually stimulating process; however, in the present as in the past, in most cases immersion is mentally absorbing and a process, a change, a passage from one mental state to another. It is characterized by diminishing critical distance to what is seen and increasing emotional involvement in what is happening. Aesthetic experience, which builds on concepts of spaces for thought or theories of distance, tend to be undermined by strategies of immersion, Visions of new media of illusion, whether for science and technology or for art, are, in the case of art, not merely reactions to technological innovations but art often plays a seminal role in their development.

The gain in power of suggestion is thus revealed as primary goal and core motivation in the development of new media of illusion. This appears to be the main force driving their developers, who, with new potential for suggestion, enhance power over the observers in order to erect the next new regime of perception. Panorama, film, and computer image displays are aggregates of continually changing machines, forms of organization, and materials; in spite of all efforts at standardization seldom stable but always driven by the fascination of increasing the illusion. We see a never-ending stream of phenomena, which, on closer scrutiny even of supposedly secure entities, such as cinema, prove to be just elements that continually regroup in a kaleidoscope of evolutionary art media development. An overview of their historical development demonstrates the monumental dimensions of the energy involved in the search for and production of ever-new spaces of illusion. What visual strategies and which kinds of interface are used today to produce immersion?

Visions

a. Alina Plewe: Ultima Ratio

With *Ultima Ratio* Daniela Alina Plewe pursues an ambitious goal: she attempts to generate a visual language for argumentation as demanded by a particular situation, which particularly represents the logic and internal arguments of the protagonists on which future action will rest *(Ill. 2)*. The basic aesthetic experience of *Ultima Ratio* is conflict. Once involved, the visitor must make a choice, actively and creatively, to deal with an ambivalent situation. For example, a visitor involved in a well-known dramatic situation is asked, Should Hamlet kill Claudius while he is praying? Hamlet wants to revenge the assassination of his father, an argument for, but contemporary beliefs said that if one was killed while at prayer, one would go straight to heaven — an argument against. Pro and contra arguments are visualized, can be weighed or automatically evaluated. *Ultima Ratio*'s databank stores various types of conflicts from life and literature plus the input from the installation's visitors. It is a flexible system of interactivity of theoretically limitless complexity, which is expanded by the discourse and modifications of the users. In *Ultima Ratio*, the visitors stand under a disk-shaped projection screen with a radius of several meters — rather like a ceiling panorama. An eyetracker is the natural interface to the virtual theater of strategic imaged arguments, which follows the visitor's gaze and enables the diagrams to be distorted according to any change in the observer's perspective. What *Ultima Ratio* offers is a first glimpse of an open system of theater, which allows the audience to participate interactively at a high level of abstraction and dramaturgy in the solution of open conflict.

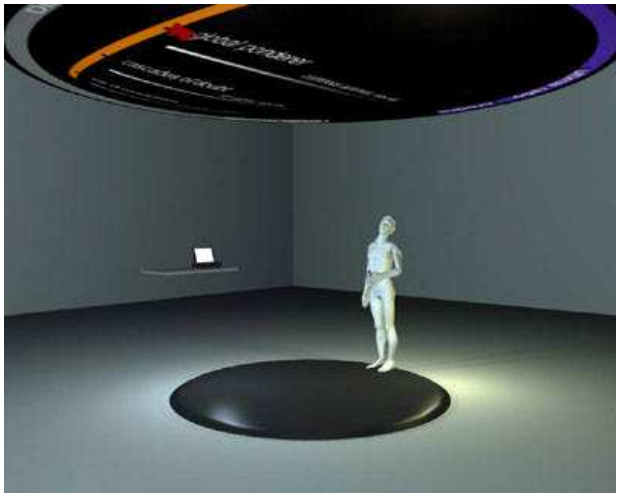
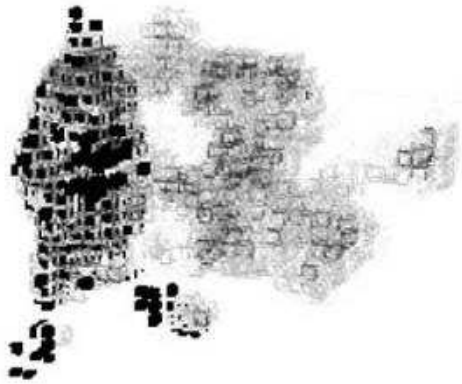


Fig. 2: Daniela Alina Plewe, Ultima Ratio, 1999.

b. Simon Penny: Traces

Above all, it is global access to and exchange of images, which Net art currently aims at, that the technique of telepresence enhances and this opens up a new, data-mediated epistemology — a paradox. Simon Penny's work in progress *Traces* makes the category of the interface absolute and, for the first time, creates a public, translocational, immersive image space. Four infrared stereo cameras transform in real time the users' contours into three-dimensional representations, which Penny envisages will be seen thousands of kilometers away in polysensorialy expanded image spaces. Traces marks an important stage in the development of telepresence art. It does not offer worlds of computer graphic images or navigation interfaces. Instead, users enter virtual image spaces to interact with gauzy traces of light that represent the dynamics and volumes of human bodies *(Ill. 3)*.



Ill. 3: Simon Penny: Traces, 1999.

Penny envisages that "interactions will take the form of real-time collaborative sculpturing with light, created through dancing with telematic partners."[8] Distance and proximity coincide in real time

[8] http://imk.gmd.de/docs/ww/mars/proj1_4.mhtml

giving rise to a paradox: *I am there where I am not and experience sensory proof of this against my better judgment.*

c. Genetic Art and the Net

Recently, artist-scientists such as Thomas Ray, Christa Sommerer, and Jane Prophet have begun to simulate processes of life: evolution, breeding, and selection have become methods for creating artworks. With the help of genetic algorithms, image worlds generated by computers are endowed with the semblance of being alive. The debate on genetics and artificial life conducted at first within the life sciences[9] was later complemented by models, visions, and images developed by artists, which have become reference points and catalysts in this controversial debate. Accessed via a variety of interfaces, the Internet is conceived of as a living sphere. To provide a testing ground for the complex systems and origins of life, Sommerer and Mignonneau propose a web-based environment, which, like their work *VERBARIUM*, allows participatory and interactive access via the Net.[10] Thomas Ray's *Netlife* goes even further: he predicts that artificial intelligence in machines will arise in the Internet. *Netlife*, says Ray, will be able to go, physically and autonomously, anywhere on the planet in a matter of milliseconds. The stream of data will be direct sensory experience for this species; although one wonders what sensorium Ray sees as being activated here. Digital, nonmaterial environmental conditions prevent humans from being able to imagine how such an existence "feels." Thus the ancient concept that produced Mixed Realities even in classical times, has now given way to a uniform, common digital sphere— whose animated image worlds are defined as real by the A-Life enthusiasts — that is ubiquitous and seemingly alive. Media archaeology has excavated a wealth of experiments and designs, which failed to become established but, nevertheless, left their mark on the development of art media. That which was realized, or has survived, represents but a tiny fraction of the imaginings that all tell us something, often something unsettling, about the utopian image dreams of their epochs.

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[9] LANGTON, Christopher G., ed. 1995. *Artificial Life*. Cambridge MA: MIT Press.

[10] Laurent Mignonneau and Christa Sommerer: Modelling emergence of complexity: The application of complex system and origin of life theory to interactive art on the Internet, in: Artificial Life VII conference proceedings, ed. Marc A. Bedau et al., Cambridge: MIT Press 2000, pp. 547–554.