

The Complex and Multifarious Expression of Digital Art & Its Impact on Archives and Humanities

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ABSTRACT: The article emphasizes the variety of (complex) topics that are expressed within digital art, ranging from globalization, ecological and economic crises (virtual economy), media and image revolution to questions of the body and its societal norms. Considering its technological and thematical contexts, digital art conveys different – even more complex – potentials of expression than traditional art forms (such as sculptures, paintings etc.), what makes digital art a paradigmatic expression of its time. Due to the imminent problems of archiving, the digital arts are threatened by its loss – a problem that is reinforced by the insufficient practices of cultural institutions to display, collect and research digital art. Considering a cultural system that is primarily financed by public funding, this aspect raises – not the least – questions of democratic policy. Post-industrial societies require digital arts based on contemporary media dispositives to reflect upon current and future challenges, just like art history was always informed by its contemporary media technologies. By establishing concerted international strategies and new scientific tools it is the aim to put media art histories/image science as well as the digital humanities on a contemporary basis in order to enable the humanities to meet with its (current) responsibilities. By discussing examples from a variety of projects from the natural sciences and the humanities, this article tries to demonstrate the strategic importance of these collective projects, especially in their growing importance for the humanities.

Introduction

Compared to traditional art forms — such as painting or sculpture — media art has more multifarious potential for expression and visualization; although underrepresented on the art market, which is driven by economic interests, it therefore became “the art of our time”; thematizing complex challenges for our life and societies, like genetic engineering (Anker and Nelkin 2003; Hauser 2008; Kac 2009; Reichle 2005), the rise of post human bodies (Hershman-Leeson 2007), ecological crises¹ (Himmelsbach 2007, Cubitt 2005, Demos 2009, Borries 2011), the image and media revolution (Grau 2011; Mitchell 2011) and with it the explosion of human knowledge (Vesna 2007, Manovich 2011), the change towards virtual financial economies² and the processes of globalization³ and surveillance to name just a few. Visually powerful, interactive Media Art, often supported by databases or the www, is offering more and more degrees of freedom in creative expression and evidently is much better equipped to directly address the challenges of our complex times within the very medium that shapes them. Although it has been around for decades and even quantitatively dominated many art schools, digital media art has not fully arrived in the core collecting institutions of our societies. Due to the lack of institutional support and rapid changes in storage and presentation media, works that originated approximately 10 years ago can often not be shown anymore. It is no exaggeration to state that we are facing the "total loss of an art form" created in the early times of our post-industrial digital societies. Over the last fifty years digital Media Art has evolved into a vivid contemporary factor. Although there are well attended festivals worldwide⁴, funded collaborative projects, discussion forums, publications (Da Costa and Kavita 2010; Dixon 2007; Gardiner 2010; Grau 2003a and 2011; Popper 2007; Shanken 2009; Sommerer and Mignonneau 2007; Vesna 2007; Wilson 2010) and

database documentation projects⁵, Digital Media Art is still rarely collected by museums, barely supported within the mainframe of art history and with relatively low accessibility for public and scholars.

Media Art's Revolution?

Media art is the art form using the technologies that fundamentally change our societies. Globalization, the information society, social networks, and Web 2.0 — the list could be far longer — are enabled by digital technologies. Although not all digital media art comments on social, cultural and political conditions, it is nevertheless the art form with the most comprehensive potential for cultural urgency. We know that digital art today is taking highly disparate forms, like time-based installation art, telepresence art, genetic and bio art, robotics, net art, and space art; this “art of our times” is experimenting with nanotechnology, artificial or A-life art; and creating virtual agents and avatars, mixed realities, and database-supported art. Through its expressive potential — visually, aurally and beyond; all senses can be addressed — which technically exceeds that of traditional art media from earlier centuries, e.g. painting and sculpture, digital media art attains a key role in the reflection of our information societies. The artworks both represent and reflect on the revolutionary development that the image has undergone over the past years — even as visionary demonstration of new instruments for visual analysis and tools for playful or scientific comparison of large amounts of images.⁶

Contemporary media art installations can include digital stills and video, 3D objects and animation, digital texts and music, sound objects, noises and textures, whereby different meanings may be inscribed and combined with each other. Meaning can develop by chance, experiment, and well-directed strategy. Active, "combining" users become the source for generating art and meaning if the artist leaves enough degrees of freedom to them to engage. They are dynamically involved in navigation, interpretation, transfer, contextualization or production of images and sounds which may be generated by their participation. Memory, thoughts, and experiments along with chance may create fertile connections. The art system increasingly transforms into a type of organism comprising slices that organize themselves while the user has an opportunity to experience and produce combinatory meaning.

Media Arts multifarious potential of complex expression

Thousands of artworks make use of and express the multifarious potential of media art: In the installations *Osmose* (1995) and *Éphémère* (1998) Charlotte Davies transports us into a visually powerful 3D-simulation of a lush mineral-vegetable sphere, which we can explore via a bodily interface consisting of a vest that monitors breathing; both works are classics of digital media art that generated more than 100 scientific and art-historical articles but were ignored by museum collections (Davis 1996; Davis 2003).

Open-ended questions about the complicated ethical issues involved in the manipulation of DNA are raised in Eduardo KAC's installation *Genesis* (1999) (Kac 2005, id. 2007a, id. 2007b, id. 2011).

For *UNMAKEABLELOVE* (2007), inspired by Samuel Beckett's *The Lost Ones* (1971/72), Jeffrey Shaw and Sarah Kenderdine used their cybernetic theatrical environment *Re-Actor* to create a real-time augmented world of 30 simulated humans. The dark space or "prison camp" formed by a hexagon of six rear-projected silver screens results in a powerful reappearance of the phantasmagoria.⁷ William Kentridge, one of the most known artists of our time, also has been working on the subject of a history of vision for years. Even historic image media like the mirror anamorphosis⁸, have made their way into his contemporary media art. In 2007 he created a hybrid

previously non-existent in the media history of seeing: for his 8-minute *What Will Come (Has Already Come)* he combines a hand-drawn animation film with cylindrical mirror anamorphosis, connecting it for the first time to moving images and thereby helping us to put the latest image revolution in a historical perspective.

Victoria Vesna's *Bodies@Incorporated* (1993) allowed visitors to construct their own avatars. Using a variety of Web tools, the users could create a 3D representation of their body. Throughout the site, references are made to identity politics and other concepts used to separate and identify bodies (Gonzales 2010; Vesna 1998).

The Golden Nica winner *Murmuring Fields* by Fleischmann & Strauss is yet another example of a work largely ignored by museums. Here interacting users maneuver through a virtual space of media philosophy in which statements by Flusser, Virilio, Minsky, and Weizenbaum can be heard — a new type of *Denkraum*, or sphere of thought (Fleischmann and Strauss 2000b; id. 2008), and an early prefiguration of web-based knowledge exchange.

Johanna and Florian Dombois' *Fidelio, 21st Century* (2004) named after Beethoven's *Fidelio*, was the first classical opera directed as an interactive virtual 3D experience. Protagonists embody music, follow the dramaturgic direction and react to the interventions of the audience (Dombois 2009; Dombois and Dombois 2001). All these examples demonstrate that digital media art can deal with questions and challenges of our time in an experimental and participative way, where traditional art media could simply offer metaphorical approaches. In the best humanistic tradition, digital media art takes on the big contemporary questions, dangers, and proposed transformations yet it is not adequately collected, documented, and preserved by traditional museums and art institutions. A techno-cultural society that does not understand the challenges it is facing and is not equally open to the art of its time is in trouble.

Today we know that the virtualization and increasing complexity of financial products is partly responsible for the crisis that cost us trillions of Euros and Dollars. More than a decade ago the architecture and art studio Asymptote proposed a 3D info-scape for the NYSE to manage financial data within a real-time virtual environment, providing a better, more transparent image and thereby a better idea of transactions — before we get driven into the next mega-crash.⁹ The NYSE did not want further development of a visualization of their "financial products," at least since Lehman Brothers' bankruptcy in 2008 we know why.

Ingo Günthers obsessive cartographic work "Worldprocessor" – an artwork that implicitly conveys the explosion, ubiquity as well as the availability of data by the introduction and consolidation of digital media – on illuminated globes, multiples more and more appears as a clairvoyant prefiguration of the attempts of the growing visualisation industries to make our complex time understood. From the late 80ies until now he destroyed more than 10.000 globes, in his creative process and the attempt to create a more realistic image of economy, power, and all kinds of meaningful parameters (Günther 2007).¹⁰

At least since Edward Snowden's release of documents we know that Facebook also is systematically used for NSA Surveillance, but many artists, like Seiko Mikami in her robotic installation *Desire of Codes, 2011*, dealt with this big issue of our time already before the worldwide espionage became known.¹¹ Paolo Cirio's and Alessandro Ludovico's *Face to Facebook* (2001) so addressed the issue in the form of a "media hack performance" as social experiment: the artists stole 1 million Facebook profiles, filtered them with face recognition software and then posted them on a custom-made dating website, searchable by gender and characteristics identified on the basis of their facial expression. Cirio's and Ludovico's mission was to give all these virtual identities a new shared place to expose themselves freely, breaking Facebook's constraints and boring social rules. The project is a form of artistic activism that also is meant to explore the contested space of ownership rights to personal data

from multiple perspectives, crossing boundaries between personal and corporate spaces and opening them up for controversy and dispute, and exposing the simplifying aspects of face recognition. The performative intervention generated approx. one thousand items of media coverage around the world, eleven lawsuit threats, five death threats and an exchange of letters between the artists' and Facebook's lawyers.¹²

In addition to shaping highly disparate areas of the culture, digital media art also questions notions of the "original" work of art. As we know, the interconnection "artist - original," which was still apparent in the age of craftsmanship, became fairly complicated through mechanization and multiplication in the post-industrial era. Today, the software supporting digital artwork by definition exists in a multiplied state. Intensifying this condition are the complicated iterations generated by the interactive interventions of users within the framework of a piece enabled by the degrees of freedom that the artist offers — a multiplication of the expressions of the work.

The more open the system of the artwork is constructed, the more the creative dimension of the work moves towards the normally passive beholders who transform into players and can select from a multitude of information and aesthetic expressions. They can recombine, reinforce or weaken, can interpret, and partly even create. The previously critically distanced relationship towards the object — the precondition of the aesthetic experience and scientific insight in general, as described by Cassirer (1954; 1963), Adorno (1973) or Serres (1981, 152) — now changes towards a field of participative experience.

Media Art and the Humanities

It is essential to create an understanding of the fact that the present "image revolution," which uses new technologies and has also developed a large number of so far unknown visual expressions, cannot be conceptualized without our image history. Art history and media studies help understand the function of today's image worlds in their importance for building and forming societies. By telling the history of illusion and immersion, the history of artificial life or the tradition of telepresence, art history offers sub-histories of the present image revolution. Art history might be considered a reservoir in which contemporary processes are embedded, an anthropologic narration, on the one hand, and the political battleground where the clash of images is analyzed, on the other. Furthermore, art-historical methods may strengthen our political-aesthetic analysis of the present through image analyses. Last but not least, the development and significance of new media should be illuminated, since the first utopian expressions of a new medium often take place in artworks.

The evolution of media art has a long history and by now a new technological variety has appeared. Today's media art cannot be fully understood without its history. In 2005, the Database for Virtual Art, the Banff New Media Institute, and Leonardo produced the first international MediaArtHistories conference. Held at The Banff Centre in Canada, *Refresh!* represented and addressed the wide array of 19 disciplines involved in the emerging field of media art¹³. Through the success of the following conferences at House of World Cultures in Berlin in 2007 (following a brainstorming conference in Göttweig in 2006 hosted by the Department for Image Science at the Danube University, Austria), Melbourne in 2009, Liverpool in 2011, Riga in 2013 and Montreal in 2015 a by now established conference series was produced.¹⁴ It was not planned to create a new canon, but rather to build a platform for the many-voiced chorus of the approaches involved. The subtitle HistorIES opened up the thinking space for include approaches from other disciplines beside "art history."

All the conferences around the world were organized via the MediaArtHistory.org platform, which is developing into a scholarly archive for this multi-faceted field, ranging from art history, to media, film, cultural studies, computer science, psychology etc. A couple of thousand peer-reviewed applications have been coordinated on MediaArtHistory.org.¹⁵ With the 19 disciplines represented at *Re:refresh!* serving as its base, MAH.org is evolving with future conferences under the guidance of an

advisory board including Sean Cubitt, Paul Thomas, Douglas Kahn, Martin Kemp, Timothy Lenoir and Machiko Kusahara.

Image Science: From the image atlas to the virtual museum

The integration of a "new" image form into image history does not constitute a new method; there have been different historic forerunners. Inspired by Darwin's work *The Expression of the Emotions* (1872) Aby Warburg began a project outlining an art-historical psychology of human expression. His famous *Mnemosyne* image atlas from 1929 tracks image citations of individual poses and forms across media — most significantly, independent from the level of art niveau or genre. He redefined art history as medial bridge building, for example by including many forms of images. Warburg argued that art history could fulfill its responsibility only by including most forms of images including the most recent in time. The atlas, which has survived only as "photographed clusters," fundamentally is an attempt to combine the philosophical with the image-historical approach. Warburg arranged his visual material by thematic areas. He considered himself an image scientist and reflected upon the image propaganda of World War I through examination of the image wars during the Reformation. Warburg intended to develop art history into a "laboratory of the cultural studies of image history" that would widen its field to "images [...] in the broadest sense" [German original: Bilder [...] im weitesten Sinn] (Warburg 1922, 261).¹⁶ Therefore every reflection on the complexity of digital imagery and its multifarious potential could start with Warburg's research.

We all know about the fundamental historical importance of archives to both scholarship and the creation of new knowledge. Let us remember, too, that Film Studies was started by art historians. An initiative by Alfred Barr and Erwin Panofsky founded the enormous Film Library at New York's MoMA, called the "Vatican of Film" by their contemporaries. This way film research in the 1930s already incorporated a dominant image science approach and further cultivated it. The initiative allowed for the large-scale comparison of films for the first time. The same spirit, committed to new investments for infrastructures to provide for and analyze the media art of our time is needed in the digital humanities.

Art History – Visual Studies – Image Science

With strong representation from art history (Belting 2007; Bredekamp 2010; Grau 2011; Mitchell 2011; Kemp 2011), Image Science¹⁷ (and its sister discipline of Visual Studies / Visual Culture in the Anglo-Saxon tradition) encourages interdisciplinary connections with history of science, neuroscience, psychology, philosophy, communication studies, emotions research, and other disciplines (Bredekamp and Werner 2003; Zeki 2011; Jakesch and Leder 2009; Sachs-Hombach 2005; Müller 2003; Grau and Keil 2005).¹⁸

Preconditions

In contrast to other disciplines concerned with images, ones that frequently try to explain images as isolated phenomena originating in and of themselves, art history has the critical potential to define images in their historical dimension, which is the discipline's primary strength. Precisely because art history emphasizes a rigorous historicization and the practice of a critical power of reflection it can make the most natural possible contributions to the discussion around images. No image can be „read“, if one has not read other images before.¹⁹ Scientific work with images is based on three preconditions: 1. definition of the object; 2. building of an image archive; and 3. familiarity with a large quantity of images. This enables and defines the understanding that images follow a diachronic logic; without this historic base, Image Science remains superfluous and cannot realize its full potential. All of these approaches to comparison are based on the insight that images act diachronic, within a historical evolution, and never function simply as an act without reference. This diachronic dynamic

of image generations is increasingly interwoven with an understanding of images alongside those of their time, the synchronic approach. This dynamic process of change has fuelled the interdisciplinary debate about the status of the image, a debate with protagonists such as Mitchell, Belting, Elkins, Stafford and Manovich (Freedberg 1989; Crary 1990; Mitchell 1995; Elkins 1999; Manovich 2001; Stafford 2001; Gunning 2003; Huhtamo 2004). Image Science, or Bildwissenschaft, now allows us to consider media from peep-show to panorama, anamorphosis, stereoscope, magic lantern, phantasmagoria, films with odors and colors, cinéorama, IMAX and the virtual image spaces of computers (Grau 2003).

Since the academic institutionalization of art history at around 1800 different discourses emerged that dealt with the autonomy of art as well as with questions of the complexity of the image (Wind 1994): i.e. art as a (rationalized) expression of diverse cultural expressions; questions of art history in the means of a history of style; the style of a certain epoch as a manifestation of the 'Kunstwollen' (Alois Riegl) – an appropriate translation would be 'artistic will' – that fades away the differentiation of high and low artistic expressions by emphasizing the (hedonist) will to create art.

Contrary to the emphasis of the form as a means of classification of art and image making – as i.e. in the perspective of formal aesthetics most prominently developed by Heinrich Wölfflin (Wimböck 2009) – Aby Warburg opened up a viewpoint that analyses images in a complex cultural setting; his aim was to reveal the authentic position of an artwork and its visual complexity in order to understand images (Warnke 1980: 58) – not only in the context of artistic mastery – in their contemporary meaning which is informed by the 'afterlife' of certain visual traditions (Didi-Huberman 2010). Even though this technique, that lead to the iconological method of Erwin Panofsky²⁰, pointed out that the complexity of a visual work can only be understood by unfolding its intrinsic discourses, it lead to profound criticism; Ernst Gombrich claimed that Warburg's notion of the image and the solution of a 'visual puzzle', i.e. the decoding of a complex religious depiction in its contemporary contexts, was too rational. In his ground-breaking essay *Icones Symbolicae* Gombrich (1986) demonstrates that the complexity of images in art history is not only solved by 'decoding' the meaning of a certain symbol or allegory but also by considering its aesthetics and expressions (ibid. 153): Following the concept of imagery in a neo-platonic thought²¹, Gombrich states that the complexity of images is not revealed in its entirety by solving what is rationally explicable.

However, images do not reveal their meaning only in terms of hermeneutic and semiotic analyses either. It again was Warburg who introduced the term "Schlagbild" [English transl.?] (Diers 1997) to the discourse on the complexity of images to point out that (political) images have to deliver certain meanings in an immediate and effective manner. The idea of the "Schlagbild" – but without its political connotations – emerges again in Roland Barthes' notion of the "punctum" (Barthes 1980) as well as the 'starke Bild' ('strong image') (Boehm 1994); The image turns out to be a medium that is able to communicate higher emotional values than the written word.

Older definitions of the image, such as those by Gottfried Böhm, Klaus Sachs-Hombach, or W.J.T. Mitchell, became problematic in the context of the digital age. Beside earlier definitions of interactive, immersive, telematics and generative digital images (Grau 2000) this carefully crafted definition by Thomas Hensel is a good start for outlining the problems:

“IMAGES are not reducible to a particular technology (like graphic prints or neutron autoradiography), not to certain devices or tools (paint brushes or telescope), not to symbolic forms (perspective), not to genres in the broadest sense (still life or summation image), not to an institution (museum or lab), not to a social function (construction or diagnostics), not to practices/media (painting or Morse Code), materials (canvas or photographic paper) or certain symbolism (Christian iconography or alphanumeric code) — but they are virulent in all of them.” (Hensel 2008, 39)

Complex Imagery

Complex and detailed images of the past, rich of information, we find in the special light atmosphere produced by medieval church windows or illuminated book narratives (Pächt 1962; Kemp 1994, 67). Before 1500 the medieval image system (Kemp 1989) was characterized by a multiplicity of image frames (“Bildfelder”). Therefore, medieval visual works were “complex image systems” (ibid. 123) that were systematically organized by a narrative, thematic or a figurative structure. Even though the visual art works were not illusionary coherent, they were aggregate spaces (Erwin Panofsky) that combined a multitude of materials, perspectives and themes. A look at medieval triptychs, paintings, ceilings etc. would underscore this hypothesis, but it is also instructive to examine artworks that are situated in times of transition, as is the case with the ceiling of the Sistine Chapel by Michelangelo – a renaissance masterpiece that illustrates the complexity of visual art works.²² In terms of complexity, renaissance and barock ceiling panoramas sometimes demonstrated a real cosm of religious or pagan knowledge. We discover complexity in graphic prints - perhaps the most detailed image medium of the past – with their attempts to circulate encyclopedic visual knowledge and we remember of course 19th centuries panorama, the dinosaur of image history, showing scientifically and visually complex landscapes, often too far to travel or myriads of thousands of humans in bloody battle panoramas.

Complex images, defining further Media Arts potential, gain their distinctness from their undistinctness: Media Arts complexity nowadays is produced through interaction and variability, simultaneity, sequencibility and narration; connected polydimensional visual spaces of happening, experience and immersion can be created, image spaces open for unfolding and compression, development or evolution, theoretically like fractals of unlimited resolution – to give some keywords. They are created through endless creations of interfaces by ever new display innovations (Grau 2003a).

And in today's social media-based image world definitions have become even more difficult: images, along with the cultures from which they originated, are on the move; myriads of images, with extreme mobility, flow around the globe as messages of transnational and transcultural communication in fractions of a second. Images from formerly separate contexts are occupied, interpreted, amalgamated, and given new meanings. What we are witnessing at the moment is a shift in our image cultures, which are connected to international media, towards a single image culture that increasingly operates transculturally. Formerly passive recipients, who reflected on discrete works of art in a distanced yet intellectually active manner, have now become interactive users with considerable degrees of freedom in their processing of images. Moreover they have become active mediators and facilitators of image worlds, as well as their producers, in that they increasingly collect, modify, distribute, and position images selectively and strategically. New visual information often arises through dialogue in which one or more networks are involved.

The mise en scène of the images, singly or in clusters, their metamorphoses and their dissemination are significantly determined by the users of social networks. Vibrant sub-cultures develop unbeknownst with a speed of image turnover that was hitherto unimaginable. Something completely new, image & meaning, often arises from the contradictions, tensions, and differences which manifest visually. This process is nothing new in terms of theories of interculturalism: the fruitful fusion of Roman and Greek culture, for example, or of Christian and Islamic culture in medieval Spain, demonstrated this procedure over long periods of time.

In addition to global icons — seemingly banal but, as we know, actually highly complex — there also are myriads of image clouds arranged in clusters that overlay the globe like a second visual sphere. This is where different ways of seeing the world encounter each other and are actively negotiated; this is where the rudiments of a new culture form. If one wants to understand an image, at least partly, it has to be considered in context. And contexts are becoming more and more complicated due to the

many different visual media surrounding is: new here is that there apparently is no limit to the acceleration of visual exchange processes, which, because of their multifaceted branching and connections, cannot be captured or analyzed by the instruments employed by the humanities in the 19th and 20th centuries.

If ever the theory of a homogeneous or "pure" culture — ideologically elevated and repeatedly misused — had any validity, this idea is now virtually obsolete. A cultural theory that is playful and favours egalitarian exchange may be desirable, but is rather naïve if one considers the power of commercial global players to create global icons, the inroads of political control over the networks, language barriers, inadequate knowledge of digital cultural techniques, and the power of certain media conglomerates that are coming together to form economic cartels.

Collective Strategies: new Tools for the Humanities

In the first generation of Digital Humanities²³, data was everything. In the 1990s massive amounts of data were archived and searched, and databases combined for interoperable searches, yielding a complexity and realization of data at a previously inconceivable rate. Yet the amount of material to be digitized is so vast that, in reality, we are only at the tip of the data iceberg. In non-textual fields, such as the visual arts, music, performance, and media studies, we are only "at the tip of the tip." Let's remember that digital art has still not "arrived" in our societies; no matter how well-attended digital art festivals are or how many art-historical and scientific articles the artists have published. Due to the fact that this art depends entirely on digital storage methods, which are in a constant state of change and development, it is severely at risk. Many artworks that are not even ten years old can no longer be shown, and it is no exaggeration to say that half a century of art of our time is threatened to be lost for the next generations.

If we look beyond the Humanities we can conclude that, during the last decades, the natural sciences started to pursue new research goals through large collective projects: in Astronomy, for example, the *Virtual Observatory* compiles centuries worth of celestial observations²⁴; global warming is better understood with projects like the *Millennium Ecosystem Assignment*, which, at a detail never before calculable, is evaluating 24 separate life systems and the global change of which they are part.²⁵ The rapid expansion of computational power has also affected biology, and the *Human Genome Project* has already become legendary.²⁶ So far, unknown collective structures give answers to complex problems. For the field of media art research and the digital humanities in general, an appropriate approach is needed to achieve equivalent goals.

Comparable with the developments in the natural sciences, digital media and new opportunities of networked research catapult the cultural sciences within reach of new and essential research, such as appropriate documentation and preservation of media art or, even better, an entire history of visual media and human cognition by means of thousands of sources. These topics express current key questions in regard to image revolution. In order to push the development of humanities and cultural sciences, it is necessary to use the new technologies globally. Timelines and new methods of visualization are part of the history of invention of visual techniques, image content and especially their reception in the form of oral history in the popular and high culture of western as well as non-western cultures. We live in an exciting time for both Image Science and the humanities. The credo is to not give up the established individual research, but to complete it in a new way through collective, net-based working methods that allow us to deal with explosive questions in the field of humanities and cultural sciences.

The Archive of Digital Art (former Database of Virtual Art)

The *Archive of Digital Art* As a counterpart to the systematic analysis of the triad of artist, artwork and beholder in the context of digital or virtual art, we originated the first documentation project in

digital art, the Archive of Digital Art (formerly Database of Virtual Art)²⁷ (*Fig. 1*), which celebrated its tenth anniversary in 2010 (Grau 2000). As a pioneering effort supported by the German Research Foundation and Austrian Science Fund, it has been documenting the last decades of digital installation art as a collective project done in cooperation with renowned media artists, researchers and institutions. We know that today's digital artworks are "processual," ephemeral, interactive, multimedia-based, and fundamentally context-dependent. Because of their completely different structure and nature they require a modified or, as we called it a few years ago, an "expanded concept of documentation" (Grau 2003b).

[Figure 1]

As probably the most complex resource available online — hundreds of leading artists are represented with several thousand documents including technical data, and more than 3,500 articles and a survey of 750 institutions of media art are listed — the database became a platform for information and communication. The database runs completely on open-source technology and, since the artists are members, it avoids copyright problems. Besides the artists, there also are more than 250 theorists and media art historians involved making ADA a collective project.

The system allows artists and specialists to upload their information, and the ADA relies on its advisory board for making selections. Besides that, the criterion for determining whether artists are qualified to become members is the number of their exhibitions, publications, awards and public presentations; high importance also is ascribed to artistic inventions like innovative interfaces, displays, or software. The system offers a tool for artists and specialists to individually upload information about works, people, literature, exhibits, technologies, and inventions.²⁸ Over the last ten years about 5,000 artists were evaluated, of which 500 fulfilled the criteria to become a member of the ADA. From the beginning, the long-term goal of the project was not simply the documentation of festivals, awards or similar events, but the a scientific overview with the corresponding standards of quality. Members have to qualify themselves with at least five exhibitions or articles about their work, or, alternatively, could be suggested by the board.

'Bridging the gap: New developments in thesaurus research

And now coexisting with one of the probably most important little-known art collections, the Göttweig print collection — representing 30,000 prints with an emphasis on Renaissance and Baroque works²⁹ and a library of 150,000 volumes going back to the 9th century, among them the Sankt Gallen Codex — the Archive of Digital Art strives to achieve the goal of providing a deeper media art-historical cross examination. Just as the MediaArtHistories conference series aims to bridge a gap, the combination of the Göttweig collection and ADA and other databases seeks to enable further historic references and impulses. The Göttweig collection also comprises proofs of the history of optical image media, intercultural concepts, caricatures, and landscapes in panoramic illustrations. This range will provide resources for a broader analysis of media art in the future.

[Figure 2]

It is important to note that keywording is bridge building! The hierarchical thesaurus of the ADA constitutes a new approach to systematizing the field of digital art. It was built on art-historical thesauri from institutions such as the Getty and the Warburg Institute as well as categorizations developed by festivals and discussions with artists in order to support historical comparisons. On the one side, keywords that have relevance in media art were selected from the Getty Art & Architecture Thesaurus, in the subject catalogue of the Warburg Library in London. On the other side, new keywords were selected from the terms most commonly used by media festivals such as Ars

Electronica, DEAF, and Transmediale. Important innovations such as "interface" or "genetic art" are considered along with keywords that play a role in traditional arts — such as "body" or "landscape" — and thus have a bridge-building function. It was important to limit the number of keywords to a few hundred words so that members of the ADA can assign terms and tag their works without lengthy study of the index.

The range of categories leads to a natural overlap, so that the hybrid quality of the artworks can be captured through clustering. Important was the thematic usability of the categories for the humanities – to avoid developing only new terminology, separated from our cultural history. It was crucial to compile a thesaurus that connects cultural history with media art and does not isolate them from one another. As to be expected, the material has also produced a multitude of fractures and discontinuities, which are made visible in the terminology of the database.

One of the goals for the future is to both document works within a context of complex information and, at the same time, allow users to find individual details quickly. In addition to statistically quantifiable analyses and technical documentation, databases should also present personal connections and affiliations, as well as funding information, with the goal to reveal interests and dependences. Going beyond searches of themes, media art documentation should also consider questions of gender, track the movement of technical staff from lab to lab and technical inventions pertaining to art, as well as public and private funds allocated to research, and, through the thematic index, show virtual and immersive art's reminiscences of its predecessors, for example, panorama or laterna magica. Media art documentation becomes a resource that facilitates research on the artists and their work for students and academics. This way, documentation changes from a one-way archiving of key data to a proactive process of knowledge transfer.

Media Art Education

The future of media art within the digital humanities requires the further establishment of new curricula, as we developed with the first international Master of Arts in MediaArtHistories, with renowned faculty members from around the world, which also addresses the practice of and expertise in curating, collecting, preserving and archiving media arts. The necessity for an international program capable of accommodating future scholars coming from diverse backgrounds and all continents was met by a low-residency model allowing professionals to participate in the advanced program of study parallel to ongoing employment and activities. Students and specialists are brought together for concentrated blocks of time in an intensely creative atmosphere focusing on the histories of media art and its kindred arenas.

The needs of the field made it necessary to create a program specific to MediaArtHistories with a faculty of experts that universities typically would not be able to gather in one institution in order to pave the way towards the development of innovative future educational strategies in media arts. Offering both an overview of relevant approaches and the possibility for specialization through focused projects and masters theses, the Masters of Arts program provides an introduction for students new to this emergent field and depth for experienced students. The integration and continuing evolution of the aforementioned projects — the ADA, the Göttinger Graphic Collection online and the platform MediaArtHistory.org with the MediaArtHistories Archive — creates synergies with the development of courses for the program in order to support curators and archivists in their professional needs. The ultimate goal is to set a standard for administrators and policy makers so that we can work towards adjoining common methods, histories and research in the spaces shared by art history and media studies.

The problem of media art documentation today – future needs

Since the foundation of the original Database of Virtual Art a number of online archives for documentation were established: the *Langlois Foundation* in Montreal (2000-08), *Netzspannung* at the Fraunhofer Institut (2001-2005) or *MedienKunstNetz* at ZKM (2004-06) — although they continue to exist as online archives, all these projects were eventually terminated, or their funding expired, or they lost key researchers like V2 in Rotterdam, Netherlands.³⁰ The Boltzmann Institute for Media Art Research in Linz (2005-09) was also closed. Thus the original archives that often represent the only remaining image source for some works, do not only step by step lose their significance for research and preservation, but also partly disappear from the Web. Not only the media art itself, but also its documentation fades and is partly lost, so that future generations will not be able to get an idea of the past. What we need is a concentrated and compact expansion of the ability to sustain. Although a number of preservation projects³¹ have been supported over time a concerted and sustainable strategy, neither institutional nor governmental, so far does not exist. There still seems to be a tendency towards particularization in preservation, instead of a focus on concentrating forces, which is an essential strategy in most other fields.

A new structure for Media Art research

University-based research projects, in particular, and also some of those linked to museums have developed expertise that needs to be included in cultural circulation, not only in order to pass it on to future generations of scientists and archivists but also to give it a chance to flow into future university curricula in the fields of art, engineering, and media history. Clearly, the goal also must be to develop policies and strategies for collecting the art of our recent history under the umbrella of a strong, Library of Congress-type of institution. Ultimately, however, this effort can only be organized with the help of a network of artists, computer and science centers, galleries, technology producers and museums. The projects that collected culturally important documents in the past and often expired or were not further supported or lost their base must be supported and reanimated. They should be organized like a corona around an institution that takes on the duty of documentation and maybe even collection of contemporary media art. Interestingly, libraries show increasing interest in archiving multimedia works and their documentation. However, the usually complex cultural and technical knowhow needed to preserve principal works of the most important media art genres of the last decades is often lacking.

Not only can the international status of media art, its international themes and international protagonists be a hindrance in creating common projects, but the funding infrastructure of media art so far has typically promoted national projects for only two, three or a limited number of years, neglecting sustainability. A structure that updates, extends and contextualizes research — whether in historical or contemporary contexts — is badly needed. The funding and support infrastructures that have been built towards the end of the last century are not suitable for the scientific and cultural tasks in the humanities of the 21st century.

The European Commission expressed the goal to double funds for pilot projects in interdisciplinary foundational research.³² But this is not enough: for up-to-date digital humanities, the funding structures must be internationalized in ways similar to those enabling modern astronomy, genomics and climatology. In order to create enough momentum and the necessary sustainability, responsible sponsors like NSF, DFG, EU etc. have to ensure long-term and sustainable international structures. Only if we develop systematic and concentrated strategies for collection, preservation and research we will be able to fulfil the demands of digital culture in the 21st Century.

But even the best documentation and archiving cannot replace the preservation of digital-born projects, which started to be researched in a range of international projects such as *DOCAM*³³ in Canada, the *Variable Media Network*³⁴ or the *Capturing Unstable Media*³⁵ project carried out by V2. We should welcome that further basic means for promoting the reception of media art are provided,

even though much larger efforts still must be undertaken on a national and international level. We need proper and sustainable international collection and research funding policies, similar to the ones that facilitated the success of the natural sciences or collections in museum, who are in many countries forced by law to collect and preserve also contemporary art.³⁶ As recently expressed in an international declaration³⁷, signed by more than 450 scholars and leading artists from 40 countries as of 2014, there is an urgent need to create a stable international platform of interoperable archives, of expertise and support for important regional histories, and to internationalize research, modes of interpretation and shared resources. The signees of the declaration intend to establish an appropriate scientific structure for documenting and preserving, for promoting study and appreciation; to create a permanent resource for future scholars, artists, curators and creative engineers, and to make major interventions in the understanding of media as a basic framework of society. In astronomy, the funding agencies developed and modernized their systems towards sustainability, which is needed in the humanities as well. The virtual observatory infrastructure is funded on an ongoing basis, and there is international coordination between a dozen or so countries that produce astronomical data. Considering the current upheavals and innovations in the media sector, where the societal impact and consequences cannot yet be predicted, the problem is pressing.

We are experiencing exciting developments in Web 2.0, experimenting with new strategies of collective documentation and content management that exceed the work of expert networks. But one needs to keep in mind that amateurs cannot replace the work of professionals who have been educated in their field over many years — a process common in other dissemination systems. Nevertheless, amateurs can play a very important role in facing the enormous challenge of negotiating and traversing through a network of helpful exchanges and efficient guidance. Moreover a long-term commitment to the profession by the best experts in the field is needed. An enormous and sustaining infrastructure has been developed and established for traditional artistic media such as painting, sculpture, architecture, even film, photography and their corresponding archives over the course of the past century. Publicly financed archives, museums and educational institutions may be obliged to collect and preserve the art of our time, but the archival systems of our society were caught off guard by the shorter lifespan of digital storage media. What is urgently needed is the establishment of an appropriate structure to preserve at least the usual 1-6 per cent of present media art production. This important step is still missing for the first two generations of media art. If we compare the available budget for traditional art forms worldwide with the one for digital culture, we understand how inadequate the support for our present digital culture is — so low it is almost statistically immeasurable. The faster this essential modification to our cultural heritage record can be carried out, the smaller the gap in the cultural memory will be and the more light will be shed on "the dark years," which started about 1960 and last until now.³⁸ We need to take into account the hybrid character of media art, which requires a paradigm shift towards process and context recording, which increasingly includes the capture of the audience experience (Grau 2003; Muller 2008).

The hope for the future is to bring together the expertise of the most important institutions in order to create an up-to-date overview of the whole field; to provide the necessary information for new preservation programs within the museum field; new university programs for better training of the next generation of historians, curators, restorers, engineers and others involved in the preservation and new forms of open access to media art. Just as research in the natural sciences has long recognized team efforts, a similar emphasis on collaborative research should govern the thinking of the humanities.

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¹ The topic of the Transmediale Berlin in 2009: „Deep North“; Ars Electronica festival in 2009: „Human Nature“. See also the (educational) art project by furtherfield.org ‘Media Art Ecologies Program’

² See the forthcoming dissertation of Daniela Plewe, Paris, Sorbonne 2011: www.transactional-arts.com/summary.html

³ Ars Electronica’s festival theme in 2002: „Unplugged. Art as the scene of global conflicts“. See also the art projects: Ken Goldberg ‘Telegarden’ (1995-1996), Nam June Paik ‘Global Groove’ (1973), Viktoria Binshtok ‘Globen/Globes’ (2002), etoy ‘The Digital Hijack’ (1996), Marko Peljihan ‘UCOG-144: Urban Colonization and Orientation Gear-144’ (1996), Ga Zhang ‘Peoples’ Portrait’ (2004)

⁴ For example: Ars Electronica, Austria; Transmediale, Germany; Intersociety of Electronic Arts (ISEA) Conference; Dutch Electronic Art Festival; European Media Art Festival, Germany; FILE, Brasil; Microwave Festival Hong Kong; Korean Media Art Festival; Siggraph, a.o.

⁵ For example: Archive of Digital Art, <https://www.digitalartarchive.at/>; Netzspannung.org, <http://netzspannung.org/archive/>; V2_Archive, <http://framework.v2.nl>; Docam, www.docam.ca; Daniel Langlois Fondation, www.fondation-langlois.org; Variable Media Initiative, <http://variablemedia.net>

⁶ For an overview: <http://digitalartarchive.at>

⁷ Shaw got inspiration from media arts history: “The history of the cinematic experience is a rich chronicle of viewing and projection machines. Before Hollywood imposed its set of ubiquitous formats, there were a myriad of extraordinary devices, like the Lumiere Brothers Photodrama, the Cyclorama, Cosmorama, Kineorama, Neorama, Uranorama and many more. The Kaiserpanorama – a stereoscopic cylindrical panoptic peepshow – is an especially relevant forerunner of a newly configured display system, Re-Actor.”, Kenderdine and Shaw 2009.

⁸ The anamorphosis is a (historical) imaging technique that was invented in the renaissance, most prominently developed by Leonardo da Vinci. From a technical standpoint, anamorphic images are ‘distorted’ images that are reconstituted either by a mirror or a certain position of the beholder. Besides its lesser known importance in early cartography and other scientific imaging techniques, it is a technique that made an appearance most prominently in Hans Holbein’s ‘The Ambassadors’. The anamorphosis was also of great importance for baroque church ceilings to constitute certain illusionary effects.

⁹ Asymptote, *NYSE 3D trading floor* (1998), <http://www.asymptote.net> (accessed on January 30, 2014).

¹⁰ Rafael Lozano-Hemmer: *Zero Noon* (2013), George LeGrady: *Data Flow* (2008)

¹¹ See also: Ozog 2008; already a classic: Levin 2002. See also art projects: Timo Toots: *Memopol* (2012), Mediengruppe Bitnik *Surveillance Chess* (2012), Dragan Espenschied and Alvar Freude: *Insert Coin*, (2001)

¹² www.lovely-faces.com

¹³ Some of the conference results can be found in the anthology *MediaArtHistories*, Grau 2007; recently: Broeckmann and Nadarajan 2009.

¹⁴ See: www.mediaarthistory.org

¹⁵ The content development of Re:fresh! was a highly collective process. It involved three producing partners, a large advisory board, 2 chairs for each session, call and review for papers, a planning meeting in 2004, keynotes, poster session and the development of application content over the time of two and a half years.

The conference brought together colleagues from the following fields: invited speakers (based on self-description from bios) HISTORIES: Art History = 20; Media Science = 17; History of Science = 7, History of Ideas = 1; History of Technology = 1; ARTISTS/CURATORS: Artists/Research = 25; Curators = 10; SOCIAL SCIENCES: Communication/Semiotics = 6; Aesthetics/Philosophy = 5, Social History = 2; Political Science = 2; Woman Studies = 2, Theological Studies = 1; OTHER CULTURAL STUDIES: Film Studies = 3; Literature Studies = 3; Sound Studies = 3, Theatre Studies = 2; Performance Studies = 1; Architecture Studies = 1, Computer Science = 2; Astronomy 1

¹⁶ We know that National Socialism put a sudden end to this work and although its emigrants could create important impulses in the US and England, the image science approach did not return until the 70ies with the Hamburg School. See also: Wedepohl 2005.

¹⁷ Image Science has been established as the common translation of the German *Bildwissenschaft(en)*: Used at the *Wissenschaftskolleg*, Berlin, the *Journal on interdisciplinary Image Science* the Center for Image Science, Danube University, and by American colleagues like W.J.T. Mitchell and Barbara Stafford. Earlier translations like “Visual Science”, “Image History” or “Picture Studies” are no longer in use.

¹⁸ Albeit concentrated on the gravitational field of art history, the programs in Image Science at the Danube University are interdisciplinary aligned. www.donau-uni.ac.at/dis

¹⁹ Contrary to the emphasis of the form as a means of classification of art and image making – as i.e. in the perspective of Heinrich Wölfflin (Wimböck 2009) – Aby Warburg opened up a viewpoint that analyses images in a complex cultural setting; his aim was to reveal the authentic position of an artwork and its visual complexity in order to understand images (Warnke 1980: 58) – not only in the context of artistic mastery – in their contemporary meaning which is informed by the ‘afterlife’ of certain visual traditions (Didi-Huberman 2010). Even though this technique, that lead to the iconological method of Erwin Panofsky, pointed out that the complexity of a visual work can only be understood by unfolding its intrinsic discourses, it lead to profound criticism; Ernst Gombrich claimed that Warburg’s idea of the image and the solution of a ‘visual puzzle’ was too rational. In his ground-breaking essay *Icones Symbolicae* Gombrich (1986) demonstrates that the complexity of images in art history is not only solved by ‘decoding’ the meaning of a certain symbol but also by considering its aesthetics and expressions (ibid. 153): Following the concept of imagery in a neo-platonic thought, Gombrich states that the complexity of images is not revealed in its entirety by solving what is rationally explicable.

Nevertheless, images don’t reveal their meaning only in terms of hermeneutic and semiotic analyses; it was again Warburg who introduced the term ‘Schlagbild’ (Diers 1997) to the discourse on the complexity of images to point out that (political) images have to deliver certain meanings in an immediate and effective manner. The idea of the ‘Schlagbild’ – but without its political tendency – emerges again in the notion of the ‘punctum’ (Roland Barthes) as well as the ‘starke Bild’ (Gottfried Böhm); the image turns out to be a medium that is able to communicate other different values than the written word.

²⁰ ‘Ikonologie’ – the english term ‘iconology’ conveys a different approach to images (see i.e. Mitchell 1989) – is a method of analyzing artworks that was highly influenced by the philology of the symbolic form by Ernst Cassirer. Warburg introduced ‘Ikonologie’ to Art History, whereas Erwin Panofsky ‘institutionalized’ the methodology of emphasizing the meaning of an artwork instead of its form.

²¹ By combining the philosophy of Plato with Jewish and Egyptian traditions, the neoplatonic philosophy introduces – in short – a mystical system of thought that emphasizes irrational aspects in the creation of (a higher) knowledge.

²² Hofmann states that Michelangelo evokes an effect that is distinct to the concept of the central perspective (1998, 69 et seq.). The combination of multiple frames on an area of 13x36 metres is characterized by its polyfocal composition: Instead of offering a coherent illusion, Michelangelo establishes a complex pattern of different layers that dispenses with the idea of a spatial and temporal fixation. Hofmann as well as Panofsky point out that the dimensions of the bodies are varying and different layers of reality are united. The ceiling establishes a complex reference system in-between the different areas. Therefore, the beholder is encouraged to follow certain visual axes to understand the complexity of the painting.

²³ For the discussion and development of the field see the Journal *Digital Humanities Quarterly*, see also the Companion to Digital Humanities www.digitalhumanities.org/companion

²⁴ The *International Virtual Observatory Alliance* (IVOA) was formed in June 2002 with a mission to "facilitate the international coordination and collaboration necessary for the development and deployment of the tools, systems and organizational structures necessary to enable the international utilization of astronomical archives as an integrated and interoperating virtual observatory." The IVOA now comprises 17 international VO projects.

²⁵ The *Millennium Ecosystem Assessment* assessed the consequences of ecosystem change for human well-being. From 2001 to 2005, the MA involved the work of more than 1,360 experts worldwide. Their findings provide a state-of-the-art scientific appraisal of the condition and trends in the world’s ecosystems and the services they provide, as well as the scientific basis for action to conserve and use them sustainably.

²⁶ The *Human Genome Project* was an international scientific research project with a primary goal to determine the sequence of chemical base pairs which make up DNA and to identify and map the approximately 20,000-25,000 genes of the human genome from both a physical and functional standpoint. The mega project started 1990 with the collective work of more than 1,000 researchers in 40 countries, the plan was to achieve the goal in 2010. A working draft of the genome was released in 2000 and a complete one in 2003. See: IHGSC (2004).

²⁷ <http://digitalartarchive.at>

²⁸ The PostgreSQL Database is open Source and the operation system is Linux based.

²⁹ The digitisation of the collection is a project developed by the Department of Image Science at Danube University and conducted in cooperation with the Göttweig Monastery. The collection of prints at Göttweig Monastery, which itself was founded in 1083, is based on

acquisitions made by various monks since the 15th century. The first report of graphic art kept in the monastery dates back to 1621, with an archive record that mentions a number of 'tablets of copper engraving' ('Täfelein von Kupferstich'). The actual act of founding the collection is attributed to Abbot Gottfried Bessel whose systematic purchases in Austria and from abroad added remarkably a total of 20,000 pieces to the collection in a very short span of time! Reaching to the present day, the print collection at Göttweig Monastery has grown to be the largest private collection of historical graphic art in Austria with more than 30,000 prints. The Department of Image Science's digitisation centre at the Göttweig Monastery uses technology to scan paintings and prints from the collection (up to 72 million pixels), <http://www.gssg.at>.

³⁰ Also compare the *OASIS* (Open Archiving System with Internet Sharing, 2004-2007) or the *GAMA* project (2008-2009), a gateway and meta-database that is not connected with the *Europeana*. "The issue of generally accepted machine-readable descriptive languages in these semantic and metadata approaches and the long-term interoperability of databases have led to an emphasis on questions concerning the openness of the sources and the source codes." Rolf Wolfensberger. "On the Couch – Capturing Audience Experience," MA Thesis, Danube University, 2009.

³¹ Although there are a number of promising case studies archived by TATE, the Guggenheim or MOMA, as well as individual research by colleagues, such as Caitlin Jones, "Seeing Double: Emulation in Theory and Practice, The Erl King Case Study,"

<http://206.180.235.133/sg/emg/library/pdf/jones/Jones-EMG2004.pdf>
³² <http://ec.europa.eu/digital-agenda/en/our-goals> Visited 29.1.2014.

³³ *DOCAM* is a multidisciplinary research endeavour initiated by the *Daniel Langlois Foundation* in collaboration with numerous national and international partners, who wrote letters of support such as the Database of Virtual Art, and is funded by the Social Sciences and Humanities Research Council of Canada, <http://www.docam.ca/>

³⁴ <http://www.variablemedia.net/>

³⁵ <http://v2.nl/archive/works/capturing-unstable-media>

³⁶ Museum collections and archives – especially when State-owned – have the legal obligation to ensure the physical preservation, an appropriate documentation as well as the accessibility of cultural objects to researchers and the public; according regulations are stipulated in Austria by the 'Denkmalschutzgesetz' or the 'Bundesmuseengesetz' and in Germany by the 'Kulturgutgesetz'.

³⁷ MEDIA ART NEEDS GLOBAL NETWORKED ORGANISATION & SUPPORT – International Declaration
www.mediaarthistory.org

³⁸ The loss might be even more radical and total than that of the Panorama, the mass media of the 19th century. Almost 20 Panoramas survived which is much more than 3 per cent of the ever existing 360° image worlds – we should be glad if at all 3 per cent of the most important exhibited media art works.