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**The Work of Art in the Age of Digital
Manipulation**

*Jos de Mul, Erasmus University Rotterdam,
The Netherlands*

Introduction

Artists, from the prehistoric painters, who engraved and painted figures on cave walls to new media artists whose work depends on computer technologies, always have used media. Media, used here in the broad sense as ‘means for presenting information,’¹ are quite not innocent means. Ever since Kant’s Copernican revolution we know that experience is constituted and structured by the forms of sensibility and the categories of human understanding and after the so-called linguistic and mediatic turns in philosophy it is generally assumed that media play a crucial role in the configuration of the human mind and experience. Media are interfaces that mediate not only between us and our world (designation), but also and between us and our fellow man (communication), and between us and ourselves (self-understanding). Aesthetic experience is no exception: artistic media are interfaces that not only structure the imagination of the artist, but the work of art and the aesthetic reception as well.²

In this paper I aim to contribute to this reflection by analyzing the way the computer interface constitutes and structures aesthetic experience. My point of departure will be Walter Benjamin’s ‘The Work of Art in the Age of Mechanical Reproduction’, first published (in French) in the *Zeitschrift für Sozialforschung* in 1936. In this epochal essay Benjamin investigates how mechanical reproduction transforms the work of art, claiming that in this ontological transformation the *cult value*, that once characterized the classical, auratic work of art, has been replaced by *exhibition value*. The thesis I will defend in this paper is, firstly, that in the age of digital recombination, the database constitutes the ontological model of the work of art and, secondly, that in this transformation the exhibition value is being replaced by what we might call *manipulation value*.

My contribution will consist of three parts. In the first part I will discuss in some detail Benjamin’s notions of cult value and exhibition value. In the second part, taking the database as a paradigmatic model, I will sketch the basic operations that constitute computational objects. In the third part I will explain why the database ontology transforms the modern work of art, which is characterized by its exhibition value, into a postmodern work of art that is characterized by manipulation value. I will illustrate my argument by a brief discussion of two media art works of the Dutch artist Geert Mul.

Before I turn to the first part, I want to make a short remark concerning the scope of Benjamin’s essay. Though the title of his work promises an analysis of art, the scope is actually much wider. It is also an essay on economics, politics and religion. And on a

deeper level, connecting these and yet other domains, it deals with a fundamental ontological change, a transformation of human experience, closely connected with the mechanization of the reproduction of nature and culture. Likewise, the scope of my continuation of Benjamin's analysis in the age of the digital recombination is broader than art or aesthetics. It deals with the digital manipulation of nature and culture that characterizes the present 'age of informatization.'³

Cult value vs. exhibition value

Although at the beginning of his essay Benjamin emphasizes that the work of art in principle always has been reproducible – he points, for example, to the practice of making replica's of works of art – he states that mechanical reproduction represents something new. Although the Greek already knew the procedures of founding and stamping, with the emergence of woodcut graphic, engraving and etching in the Middle Ages and lithography in the beginning of the nineteenth century mechanical reproduction became a major artistic technique. However, it was only with the invention and the swift dissemination of photography and film that mechanical reproduction became the dominant cultural interface.

Before that time the dominant type of the work of art was characterized by uniqueness (*Einmaligkeit*) and singularity (*Einzigkeit*) in time and space. The original work of art is here and now (*Hier und Jetzt*). 'Even the most perfect reproduction of a work of art is lacking in one element: its presence in time and space, its unique existence at the place where it happens to be.'⁴ There is only one *Mona Lisa* and when we want to see this painting we have to go to the Louvre in Paris.



Figure 1. Visitors crowding together in front of Leonardo da Vinci's *Mona Lisa*

According to Benjamin the unique existence of the work of art determines the history to which it is subject throughout the time of its existence. This includes, for example, the changes which it may have suffered in physical condition over the years as well as the various changes in its ownership.

The traces of the first can be revealed only by chemical or physical analyses which it is impossible to perform on a reproduction; changes of ownership are subject to a tradition which must be traced from the situation of the original. The presence [*Hier und Jetzt*] of the original is the prerequisite to the concept of authenticity [*Echtheit*]. [...] The authenticity of a thing is the essence of all that is transmissible from its beginning, ranging from its substantive duration to its testimony to the history which it has experienced.⁵

Another word that Benjamin uses to designate the material and historical authenticity and authority of the unique work of art is 'aura'. Because of this aura the unique work of art easily can become an object of a magical or religious cult. Using as an example the role a statue of Venus played in the ancient Greek as an object of worship, Benjamin states:

We know that the earliest art works originated in the service of a ritual--first the magical, then the religious kind. It is significant that the existence of the work of art with reference to its aura is never entirely separated from its ritual function. In other words, the unique value of the 'authentic' work of art has its basis in ritual, the location of its original use value. This ritualistic basis, however remote, is still recognizable as secularized ritual even in the most profane forms of the cult of beauty.⁶

In a footnote Benjamin introduces the concept of *cult value* of the unique work of art and he connects it with its aura. In this context he also gives an intriguing definition of the latter concept:

The definition of the aura as a 'unique phenomenon of a distance however close it may be' represents nothing but the formulation of the cult value of the work of art in categories of space and time perception. Distance is the opposite of closeness. The essentially distant object is the unapproachable one. Unapproachability is indeed a major quality of the cult image. True to its nature, it remains 'distant, however close it may be.' The closeness which one may gain from its subject matter does not impair the distance which it retains in its appearance.⁷

When we – anachronistically - apply a key concept of the new media studies to Benjamin's analysis, we might say that the auratic work of art acts as an interface between the sensible and the supersensible, that is: between the physical materiality of the work of art and its meaningful history. Although it may be close in its material presence – we could even touch the *Mona Lisa* if there were no glass separating it from its visitors in the Louvre - and as such it brings us in close contact with its history, at the same time we experience the historical tradition, in which it is embedded and from which it derives its meaning, as an unbridgeable distance.

It is important to notice that in the auratic work of art the sensible and the supersensible, the material signifier and the spiritual meaning, are inseparably linked with one another. As such the auratic work of art, as Gadamer states in *The relevance of the beautiful* in connection with a short but illuminating discussion of Benjamin's essay, can be conceived of as a *symbol*.⁸ The destruction of an auratic work destroys the distant presence of its history as well. For that reason the destruction of a auratic work of art generally is understood as an act of blasphemy – independent of whether it has religious content or not.⁹

It is also important to notice that for Benjamin the experience of aura is not restricted to historical objects such as works of art. Benjamin also applies the concept of aura to natural objects. When we watch a mountain range on the horizon or a branch casting its shadow over us, we also experience the aura – in this case: the natural history - of those mountains, of that branch.¹⁰ We could also think about the historical sensation we experience when we look at, or touch, a fossil of for example, the bones of a dinosaur.

One of the basic claims of Benjamin's 'The Work of Art' is that in the age of mechanical reproduction by means of print, photography and film, we experience a radical loss of aura:

That which withers in the age of mechanical reproduction is the aura of the work of art. This is a symptomatic process whose significance points beyond the realm of art. One might generalize by saying: the technique of reproduction detaches the reproduced object from the domain of tradition. By making many reproductions it substitutes a plurality of copies for a unique existence. And in permitting the reproduction to meet the beholder or listener in his own particular situation, it reactivates the object reproduced.¹¹

One might say that mechanical reproduction of images brings things closer, spatially and temporally. In order to watch the *Mona Lisa*, I no longer have to travel to Paris – which even in the age of rapid transportation would take me many hours, but I can look up a reproduction in an art magazine or – nowadays even more convenient - on my mobile phone with Internet connection, immediately, here and now. Uniqueness and permanence of the auratic object are being replaced by 'transitoriness and reproducibility'.¹²



Figure 2. *Myartspace* enables art lovers to 'collect' cultural artefacts

In the example just given, a reproduction of the *Mona Lisa*, the reproduction still refers to the original work of art, of which the reproduction is (only) a copy. However, crucial in Benjamin's argument is the claim that in the age of mechanical reproduction together with the aura the cult value of the work of art gradually vanishes. In the media of mechanical reproduction, such as photography and film, the whole distinction between original and copy loses its meaning. Of course one can try to conserve the cult value, for example by printing a photograph in a limited edition or having the photographer putting his signature on it, but these cheats in fact only affirm the loss of the aura of the work itself. Cult value gives way to *exhibition value*. In the case of Andy Warhol's 'reproduction' of the *Mona Lisa*, for example, there is still a reference to the original painting of Leonardo, but the value is located in the reproduction itself and strongly connected with its reproducibility.



Figure 3. *Andy Warhol. Mona Lisa, 1978*

Whereas traditionally things were first produced and then reproduced, in the age of mechanical reproduction things are being made directly with an eye to reproduction: ‘To an ever greater degree the work of art reproduced becomes the work of art designed for reproducibility’.¹³

In Benjamin’s view, exhibition value not only becomes the dominant principle in art, but in all cultural domains in which mechanical reproduction plays a role. In his essay he especially focuses on politics.¹⁴ In the age of the mass media such as film, radio and television, the success of politicians strongly depends on how mediagenic they are, that is: on their exhibition value.

Benjamin’s essay has melancholic undertones. When he states that the aura emanates for the last time from the early photographs in the fleeting expression of a human face, he does not only mourn the loss of the ‘incomparable beauty’ and ‘melancholy’¹⁵ of these early photographs, but also the fact that in the age of mechanical reproduction we experience the human being itself loses its aura. However, at the same time – and this shows the fundamental ambiguity of Benjamin’s essay – he expresses the Marxist hope that the technical reproducibility of the work of art will – against the fascist aesthetization of politics – enable the progressive artist to politicize the arts and revolutionize the masses. The development of mechanical reproduction can neither simply be hailed as cultural progress nor simply doomed as cultural decline. Mechanical reproduction discloses the world in a new way, bringing along both new opportunities and new dangers. We should keep this fundamental ambiguity of the development of media in mind when we turn our attention to digital manipulation.

Database ontology

No other text has been quoted so often in new media studies as Benjamin’s ‘The Work of Art’.¹⁶ This is not surprising, as his prophetic insights only seem to have gained relevance in the age of the digital recombination. However, although the computer as we know it is still a mechanical machine, we should not simply equate digital reproduction with mechanical reproduction (for that reason I prefer the phrase ‘digital recombination’). Although the computer can simulate all kinds of classical mechanical machines and media, such as a typewriter, a sound recorder, or a device for the montage and display of

photographs and filmic images, it has some unique media-specific characteristics that justify the claim that it represents a new stage in the development of media.

I will give a brief sketch of the basic grammar of the computer as an artistic medium. Given the flexibility of the computer, this might seem an impossible ambition. Understood as a medium, the computer is not one but many. As already suggested in the examples I just gave of the mechanical devices the computer can simulate, artists use computers in many different ways to produce, store, display and distribute so called 'new media art'. As a means of production, for example, computers enable them to create digital images and sounds, to build interactive installations, to design multimedia websites, or to program self-evolving art forms. However, the thesis I want to defend is that on a fundamental level all media art works share some basic characteristics. Although concrete media art works may differ from each other in many different respects – and for that reason show family resemblance rather than a single essence - on a fundamental level they all share the four basic operations of persistent storage, an integral part of almost all computer software. This ABCD of computing consists of the operations Add, Browse, Change, and Destroy.¹⁷ Together these four operations constitute the dynamic elements of what we might call a *Database ontology*.

In computing, a database can be defined as a structured collection of records or data that is stored in a computer so that a program can consult it to answer queries.¹⁸ With the help of the four basic operations – which correspond to the structured query language (SQL) commands <insert>, <select>, <update> and <delete> – in principle all possible combinations of the records can be created. Database ontology is dynamic, because the growing numbers of elements are constantly combined, decombined, and recombined.

In reality, not all databases are so flexible. The traditional paper database even was rather inflexible. A classical - 'flat' - database consists of a number of cards with a limited, fixed number of fields for the input of information, for example *Name*, *Address*, and *Phone Number*. There would be no structural relationships that could be explored, and to sort the database differently – for example to group the records per country for a mailing – would be possible, but it would consume a lot of time. Although an electronic version of such a flat database could speed up the sorting according to different categories substantially, it would remain quite inflexible.

From the 1950s on, new databases have been developed such as the hierarchical in the 50s, the network model in the 60s and the relational model in the 70s. The last model, which is based on predicate logic and set theory,¹⁹ contains multiple tables, each similar to the one in the 'flat' database model. The relational database is multidimensional, and for that reason its complexity cannot be represented on a flat plane and often not even in a three dimensional model. One of the strengths of the relational model is that, in principle, any value occurring in two different records (belonging to the same table or to different tables), implies a relationship among those two records. Relational database are extremely flexible, because they enable the users to do queries that were not anticipated by the database designers. From the 80s on, object-oriented programming has also been used to create a new database model, so-called object database systems. However, the relational model – sometimes in combination with object-oriented paradigm – remains the dominant model.

Each of the database models can be regarded as an interface that represents, structures and produces the world in a specific way. When we look at the development of database

models we notice a tendency to even more flexibility and a rapidly growing range of applications. Database applications span virtually the entire range of computer software, ranging from search engines and wiki's on the Internet to mass customization in industrial production and biotechnologies such as genetic engineering. Moreover, the impact of database ontologies is not restricted to the world of computing.

The psychologist Maslow once noticed that for those who only have a hammer, everything appears to be a nail. In a world in which the computer has become the dominant technology – world-wide more than 50 billion processors are doing their job – everything becomes a database. Database ontology not only shapes the way we look at the world and ourselves, but increasingly we also shape the world and ourselves from the perspective of the database. Benjamin argues in his essay that in the age of mechanical reproduction everything becomes an object for mechanical reproduction. It has contributed to what is sometimes called a mechanization of the worldview. In the age of digital recombination everything – nature and culture alike - becomes an object of database manipulation. This has a profound impact on our worldview.

Let us take genetic engineering as an example. Life on earth is no longer primarily regarded to be a contingent and factual evolutionary constellation (as in classical Darwinism), but rather as a database – a gene pool – that contains an infinite number of virtual organisms and life forms that can be actualized at will. Although not yet as spectacular as in Spielberg's *Jurassic Park* or in science fiction films such as *Robocop*, our world is increasingly being populated with life forms created with database technologies. Why not, for example, create a mouse with a human ear on its back or design a fluorescent rabbit to watch it?



Figure 4. Mouse with human ear, University of Massachusetts Medical Center, 1995



Figure 5. Eduard Kac, Alba fluo rabbit, 2000

Unlike *Jurassic Park* and *Robocop* these examples are not the products of mere digital imaging. The mouse with the engineered human ear implanted on its back is the result of a medical experiment, carried out by Charles Vacanti at the University of Massachusetts Medical Center in 1995, whereas the fluo rabbit was 'created' by the Brazilian artist Eduard Kac, who commissioned the 'transgenic' bunny from a French lab, where scientists injected green fluorescent protein (GFP) of a Pacific jellyfish into the egg of an Albino rabbit.

Both Vacanti's and Kac's experiments have led to heated ethical debates. Moreover, in the case of Kac's fluo rabbit the question was also raised whether this 'work' can be called a work of art. In this sense the rabbit provokes similar questions as, about ninety years ago, Duchamp's readymades, such as L.H.O.O.Q., a cheap postcard-sized reproduction of the Mona Lisa, upon which Duchamp drew a mustache and a goatee.



Figure 6. Marcel Duchamp, L.H.O.O.Q., 1916

The fact that both Duchamp's L.H.O.O.Q. and Kac's fluo rabbit raise the question whether they are a work of art is that they both employ a new, seemingly non-artistic medium of production as a means for artistic production, questioning the very distinction between artistic and non-artistic objects. However, although these circumstances may elucidate the emergence of this aesthetical question, it does not yet provide an answer to it. As Benjamin's essay suggests an answer, we have to return to it once more.

Database aesthetics

In 'The work of art' Benjamin remarks that there is no timeless answer to the question whether a particular object should be regarded as a work of art. An object that once first and foremost was an instrument of magic can later come to be recognized as a work of art. In the same way, Benjamin suggests, 'by the absolute emphasis on its exhibition value the work of art becomes a creation with entirely new functions, among which the one we are conscious of, the artistic function, later may be recognized as incidental.'²⁰

Whereas in the age of mechanical reproduction it already becomes difficult to distinguish between the artistic and non-artistic functions of the reproduction – hence, for example, the aesthetization of politics and the politization of art which plays such an important role in Benjamin's essay - in the age of digital manipulation the distinction seems to get blurred altogether. Let me illustrate this by showing you a recent database work of the

Dutch computer artist and video jockey Geert Mul. Commissioned by the Dutch Photo Museum in Rotterdam he built the interactive installation *W4 (WHO, WHAT, WHEN, WHERE)*.²¹ This installation consists of a database containing 80.000 photographs from the Digital Archive of the museum and four posts that function as a filter. With the help of the functions who, what, when and where the user can explore the entire digitalized collection of the museum. For example, one can investigate all photographs of flowers made in Germany in 1936. Or all pictures of the *Mona Lisa* made between 1900 and 1920. This installation can be regarded as an interface designed to enable the visitors to display the collection of the museum. Every visitor of the museum becomes a curator that can create his own exhibitions. But at the same time it is a powerful interactive artwork that transforms the visitors into VJ's that create rhythmic compositions of photographs.



Figure 7. Geert Mul. W4 (WHO, WHAT, WHEN, WHERE), 2007

What makes this installation both a brilliant example of human-computer interface design and an autonomous work of art is its *manipulation value*. In the age of digital recombination the value of an object depends on the extent of its openness for manipulation.²² For a contemporary scholar, a digitalized version of Benjamin's collected works is of much greater value than a traditional paper edition, because it enables him, for example, to select in a split second all pages on which the word 'aura' appears. The aesthetic quality of a work strongly depends on the elegance of the program and the user interface. 'A "conception" of the "beauty" of a database is not located in the viewer's interpretation of a static form but in the dynamics of how a user inflects the database through interaction with its field or frame'.²³ As soon as the database play becomes a goal in itself, the database becomes an autonomous work of art. As *W4* shows a database can be both an instance of applied user interface design and an autonomous work of art.

As the number of recombinations of a database is almost infinite, the work of art in the age of digital recombination brings about a return of the aura. Especially in those cases where the user is enabled to change the contents of the database and to insert new elements in the database each query becomes a unique recombination. And as a consequence the digitally recombined work of art regains something of its ritual dimension. It becomes an interface between the sensible and the supersensible again. However, this time the supersensible is no longer to be located in the history of the work, but in its *virtuality*, that is: the intangible totality of possible recombinations. In the

domain of culture we could think, for example, of websites such as *Mega Mona Lisa*, where visitors are being invited to create and discuss their unique own version of Leonardo's *Mona Lisa*.²⁴ In these versions we witness 'the return of the aura'. However, it is a return with a twist: what we experience is a series of 'original, auratic copies'.²⁵ The return is also twisted because digitally manipulated objects are even more transient than mechanical reproductions. Because of their manipulability digital objects seem to be inherently unstable, like the performing arts process rather than product.²⁶



Figure 8. *Mega Mona Lisa* (www.megamonalisa.com/) has collection of thousands of user-submitted Mona Lisa art works.

As already noted, database ontology is not restricted to the domain of culture, but applies to nature as well. In both domains database ontology shows a post-historical character. In the age of digital recombination, dinosaurs are no longer exclusively extinct species, but they have become a future possibility as well.²⁷ Again the result will be a series of 'auratic copies'. After all, as they will appear in a drastically changed environment they unavoidably will be different species.

Depending on their use, digitally recombined objects such as Kac's fluo rabbit might be works of art. However, like Benjamin we would like to know whether such works can function as political works of art. That digital recombination as a means of production is no less political than mechanical reproduction is evident. Power, political power included, is increasingly becoming dependent on the ability to manipulate information. One of the most prophetic claims in Benjamin's essay is that in the age of mechanical reproduction, the success of political leaders increasingly became dependent on their exhibition value. However, in the western world Ronald Reagan – a former film actor – probably has been the last president who could still mainly rely on his exhibition value. In the age of digital manipulation politicians are becoming more and more dependent on their manipulation value. We not only should think of the possibility of intended manipulation of computer-mediated elections, but also of the non-criminal everyday recombination of data in order to create, control and evaluate financial, economical and social policies.

However, for a work of art to be political, it is not enough to be digitally recombined. Digitally recombined works of art differ from other digitally recombined objects because they have a reflective quality as well. A work of art challenges its recipient by directing his or her attention to the medium itself. Works of art are self-reflective media. They are not political because they represent politics, but because they make us aware of the

politics of representation. And they are not political because they manipulate politics, but because they reflect on the politics of manipulation. Only as far as the fluo rabbit makes us reflect on the working of dominant medium of our age, it can be called political art.²⁸

A work that invites the spectator to political reflection is Geert Mul's *Match of the day* (2006), part of a series database art works, entitled *Split Representations*. In the case of *Match of the day*:

a computer collects at random intervals images from about thirty international satellite television channels. During the night, Image-Recognition software analyzes the recorded images. It compares television news with television commercials. The software compares every image with every other single image stored in the computer, checking 5000 specified characteristics in each image. After 1000.000.000 comparisons, the computer generates a list. Images that share the most characteristics appear in pairs at top of this list. The artist then selects a few pairs of images out of the hundreds of pairs of images, which according to the computer make a good visual match. In a daily e-mail-series subscribers receive this selection: the match of the day.²⁹



Figure 9. Geert Mul. MATCH_OF_THE_DAY, 2006

By combining television news with television commercials the matches of the day represent the current socio-economic situation of the western world. On this level it is a representation and manipulation of politics. However, the recipient also gradually becomes aware of the politics of representation and manipulation. 'The computer does not 'understand' the images, it just applies pixel statistics. For the human eye visual similarity is something else than pixel statistics. Because of our inability to 'see' without interpretation we attach 'meaning' to everything we see. This becomes especially evident when similar images appear to have a different or even contrary meaning. The "matches" found by the computer and selected by the artist, trigger sensations of poetry, humor, beauty or disgust.³⁰ But gradually we become aware of the unapproachability of the workings of a technology that we have invented. And we might even start to reflect on the non-human and maybe even inhuman character of this new medium. Or on the possibility that it gradually will outstrip our skills to add, browse, change and destroy. And that we might become the ultimate object of digital manipulation. In 'The work of art', Benjamin worries about the fact that mechanical reproduction alienates human beings. Realizing the possibility that we might be the first species that creates its own successors in the evolution of life and by doing so making *itself* redundant, Benjamin's worries may soon become an object for nostalgia.

¹ We should realize that the concept 'media' covers many different categories by which we define media (differentiate them from other media). Even when we restrict ourselves to so called 'new media' (or 'computer media'), the word 'media' might refer to a variety of different things, such as *material carriers* (e.g. magnetic tape, CD; floppy disk, hard disk, USB-stick); *initial production technologies* (e.g. word processor; web cam, paint program, synthesizer), *storage and reproduction technologies* (e.g. CD burning, copying digital files), *symbolic-material forms* (e.g. live streams, websites, mailing lists), *distribution apparatus* (e.g. broad casting; web servers, networks), *social-physical settings* (e.g.; manipulating icons on a computer desktop), or *modalities of perception, reception and interpretation* (e.g. acoustic; visual; bodily immersiveness; movement; extra sensory perception by a spiritual sixth sense). If in the following the word 'media' is used, the reader must be aware of the fact that the analysis still is in need of a further, more detailed investigation of these different aspects of mediation.

² This view does not imply media determinism. 'Technology does not determine society: it embodies it. But neither does society determine technological innovation: it uses it.' Manuel Castells, *The Information Age: Economy, Society and Culture. Volume I: The Rise of the Network Society* (Oxford: Blackwell Publishers, 1996), 5. In other words: media develop in a constant dialectical interplay with other cultural domains, such as science, economy and politics, and cannot be abstracted from human action and decisions. For that reason reflection on the media we live by is of utmost practical value.

³ See for a detailed analysis of the transformation from mechanization to informatization: Jos de Mul, "The Informatization of the Worldview," *Information, Communication & Society* 2.1 (1999): 604-29.

⁴ Walter Benjamin, "Das Kunstwerk Im Zeitalter Seiner Technischen Reproduzierbarkeit," *Gesammelte Schriften*, Bd. 12 (Frankfurt a/M, 1974); quoted from the translation by H. Zohn: Walter Benjamin, "The Work of Art in the Age of Mechanical Reproduction," *Illuminations* (New York: Schocken Books, 1969). I've used the online version of this translation available at: <http://pages.emerson.edu/Courses/spring00/in123/workofart/benjamin.htm>.

⁵ Benjamin, "Das Kunstwerk".

⁶ Benjamin, "Das Kunstwerk". In a footnote, Benjamin elucidates this as follows: 'To the extent to which the cult value of the painting is secularized the ideas of its fundamental uniqueness lose distinctness. In the imagination of the beholder the uniqueness of the phenomena which hold sway in the cult image is more and more displaced by the empirical uniqueness of the creator or of his creative achievement. To be sure, never completely so; the concept of authenticity always transcends mere genuineness. (This is particularly apparent in the collector who always retains some traces of the fetishist and who, by owning the work of art, shares in its ritual power.) Nevertheless, the function of the concept of authenticity remains determinate in the evaluation of art; with the secularization of art, authenticity displaces the cult value of the work.' (idem).

⁷ Benjamin, "Das Kunstwerk".

⁸ 'I propose that the symbolic in general, and especially the symbolic in art, rests upon an intricate interplay of showing and concealing. In its irreplaceability, the work of art is no mere bearer of meaning – as if the meaning could be transferred to another bearer. Rather the meaning of the work of art lies in the fact that it is there'. Hans Georg Gadamer, *The Relevance of the Beautiful and Other Essays* (Cambridge/New York: Cambridge University Press, 1986), 33.

⁹ 'There is a leap between the planning and the executing on the one hand and the successful achievement on the other. The thing now "stands" and thereby is "there" once and for all, ready to be encountered by anyone who meets it and to be perceived in its own "quality". This leap distinguishes the work of art in its uniqueness and irreplaceability. Walter Benjamin called it the aura of a work of art. We are all familiar with this from the sense of outrage we feel over artistic "sacrilege". The destruction of a work of art always has something of the feeling of religious sacrilege about it'. Gadamer, *The relevance of Beauty and Other Essays*, 33-4. See about 'artistic sacrilege' also Jos de Mul, "Résonances de la mort de Dieu, Après les fins de l'art," *Figures de l'Art. Revue d'Études Esthétiques. No X: L'esthétique, aujourd'hui?* Ed. Bernard Lafarque (2005): 265-77.

¹⁰ 'The concept of aura which was proposed above with reference to historical objects may usefully be illustrated with reference to the aura of natural ones. We define the aura of the latter as the unique phenomenon of a distance, however close it may be. If, while resting on a summer afternoon, you follow with your eyes a mountain range on the horizon or a branch which casts its shadow over you, you experience the aura of those mountains, of that branch.' Benjamin, "Das Kunstwerk".

¹¹ Benjamin, "Das Kunstwerk".

¹² According to Benjamin, 'the contemporary decay of the aura [...] rests on two circumstances, both of which are related to the increasing significance of the masses in contemporary life. Namely, the desire of

contemporary masses to bring things "closer" spatially and humanly, which is just as ardent as their bent toward overcoming the uniqueness of every reality by accepting its reproduction. Every day the urge grows stronger to get hold of an object at very close range by way of its likeness, its reproduction. Unmistakably, reproduction as offered by picture magazines and newsreels differs from the image seen by the unarméd eye. Uniqueness and permanence are as closely linked in the latter as are transitoriness and reproducibility in the former. To pry an object from its shell, to destroy its aura, is the mark of a perception whose "sense of the universal equality of things" has increased to such a degree that it extracts it even from a unique object by means of reproduction. Thus is manifested in the field of perception what in the theoretical sphere is noticeable in the increasing importance of statistics. The adjustment of reality to the masses and of the masses to reality is a process of unlimited scope, as much for thinking as for perception.' Benjamin, "Das Kunstwerk".

¹³ 'From a photographic negative, for example, one can make any number of prints; to ask for the "authentic" print makes no sense. But the instant the criterion of authenticity ceases to be applicable to artistic production, the total function of art is reversed. Instead of being based on ritual, it begins to be based on another practice--politics.' Benjamin, "Das Kunstwerk".

¹⁴ This is comparable to the situation of the work of art in prehistoric times when, by the absolute emphasis on its cult value, it was, first and foremost, an instrument of magic. Only later did it come to be recognized as a work of art. In the same way today, by the absolute emphasis on its exhibition value the work of art becomes a creation with entirely new functions, among which the one we are conscious of, the artistic function, later may be recognized as incidental. Benjamin, "Das Kunstwerk".

¹⁵ Benjamin, "Das Kunstwerk".

¹⁶ The titles of several publications even refer to Benjamin's essay. See: David Harvey, "The Work of Art in the Age of Electronic Reproduction," in *The Condition of Postmodernity* (Oxford: Basic Blackwell, 1989), 346-50; Douglas Davis, "The Work of Art in the Age of Digital Reproduction: An Evolving Thesis," *Leonardo* 28.5 (1995): 381-86. Douglas H. Thomson, "The Work of Art in the Age of Electronic (Re)Production," 1998, *Romanticism on the web* (May 1998). <http://users.ox.ac.uk/~scat0385/work.html>; Hans Ulrich Gumbrecht and Michael Marrinan, eds., *Mapping Benjamin: The Work of Art in the Digital Age* (Stanford, CA: Stanford University Press, 2003).

¹⁷ These four basic operations are also referred to with the acronyms CRUD (Create, Read, Update, Delete) and ACID (Add, Change, Inquire, Delete).

¹⁸ Actually, the word 'database' might refer to three different things: 1) the *data* that are being stored; 2) the way these data are stored and connected, that is: the *database model*; and 3) the *software* used for the storage and manipulation of the data, the Database management system (DBMS). In the present context, I am mainly referring to database models.

¹⁹ E.F. Codd, "A Relational Model of Data for Large Shared Data Banks," *Communications of the ACM* 13 6 (1970): 377-87.

²⁰ Benjamin, "Das Kunstwerk".

²¹ See www.geertmul.nl.

²² A comparable point has been made by William Mitchell: 'We might best regard digital images, then, neither as ritual objects (as religious paintings have served) nor as objects of mass consumption (as photographs and printed images are in Benjamin's celebrated analysis), but as fragments of information that circulate in the high-speed networks now ringing the globe and that can be received, transformed, and recombined like DNA to produce new intellectual structures having their own dynamics and value. If mechanical image reproduction substituted exhibition value for cult value as Benjamin claimed, digital imaging further substitutes a new kind of use value – *input* value, the capacity to be manipulated by computer –for exhibition value.' William J. Mitchell, *The Reconfigured Eye: Visual Truth in the Post-Photographic Era* (Cambridge: MIT, 1994), 52.

²³ 'A "conception" of the "beauty" of a database is not located in the viewer's interpretation of a static form but in the dynamics of how a user inflects the database through interaction with its field or frame. A database incorporates contradiction; it is simultaneously recombinant and indexical, precise and scaleable, immersive and emergent, homogeneous and heterogeneous. It is a field of coherence and contradiction. The aesthetic dimensions of the database arise when the user traverses this field of unresolved contradictions. The database is comprised of nested subfields which are activated, and given ontological status, by the user's trajectory through its field. Continuously emergent ontological states resolve as new subfields from each interaction and are integrated into the field - changing and transforming the content and structure of that field and constituting the "art object" as a continuously evolving and fluid system. These are the conditions of possibility of a "database aesthetics." An argument for the "conditions of possibility" of

database aesthetics can be "grounded" in the analysis of systems found in the world.' Sharon Daniel, "Collaborative Systems: Evolving Databases and the 'Conditions of Possibility' -- Artificial Life Models of Agency in on-Line Interactive Art," *AI & Society. The Journal of Human-Centred and Machine Intelligence* 14.2. Database Aesthetics: Issues of Organization and Category in Online Art (2000): 196-213.

²⁴ Retrospectively, specific works of art from the auratic tradition re-appear differently in the light of data ontology. Examples of such remediations are works that have been produced in (e.g. Mondrian and Stella) or that utilize recombination of elements within the single work (e.g. the minimal music of Steve Reich).

²⁵ Cf. Douglas Davis, "The Work of Art in the Age of Digital Reproduction: An Evolving Thesis," *Leonardo* 28.5 (1995): 381-86.

²⁶ Eric Bolle, et. al., *Book for the Unstable Media* (Den Bosch: V2, 1992).

²⁷ In this sense the database ontology combines *virtual reality* (understood as the infinite number of possible recombinations) with *real virtuality* (the recombinations that are actually being realized).

²⁸ Although the intention of the artist is not decisive, in the case of Kac the aim without doubt is political: "My work doesn't visualize science, it is not meant to duplicate the information that circulates from science to media to the public. It is meant to intervene, to change, to criticize, point out, reflect and modify." Quoted in: Ulli Allmendinger, "One Small Hop for Alba, One Large Hop for Mankind," *NY Arts Magazine*, 2001.

²⁹ Description quoted from: www.geertmul.nl/Geert_Mul/MATCH-OF-THE-DAY.html

³⁰ Geert Mul, op.cit.

Jos de Mul. Full Professor of Philosophy of Man and Culture at the Faculty of Philosophy of the Erasmus University Rotterdam. His research interests include philosophical anthropology, aesthetics, philosophy of technology and history of nineteenth century German philosophy. Among his publications are *Romantic Desire in (Post)Modern Art and Philosophy* (State University of New York Press, 1999), *The Tragedy of Finitude. Dilthey's Hermeneutics of Life* (Yale University Press, 2004), and: *Cyberspace Odyssey* (Guangxi Normal University Press, 2007). Forthcoming: *The Domestication of Fate. The Rebirth of Tragedy out of the Spirit of Technology*.