

Lev Manovich **and** the Language of New Media

Lev Manovich and The Language of New Media

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Preface

In his book The Language of New Media (2001), Lev Manovich focuses in particular on interface (the language of the screen), operations (e.g. digital compositing), digital illusions and forms (e.g. the database form replacing the traditional narrative form). Referring to space in computer games, database navigation and the materiality of sound, respectively, the three essays in this volume discuss some of the concepts in Lev Manovich's book.

Keywords: New media, theory, narrative, database, navigation, switching, computer games, space and game space, philosophy of space, art history, the literate composer, the sound object, representation of music

On May 6 2003, Modinet (Media and Democracy in the Network Society) and The Centre for Internet Research organized a workshop on *The Language of New Media*. Lev Manovich, Associate Professor in the Visual Arts Department at the University of California, San Diego, opened the workshop with a lecture entitled *What is New Media: Eight Propositions*. At this workshop, the contributors presented the essays included in this issue and participated in a concluding discussion. Bo Kampmann Walther's paper zeroes in on the relation between historiographic and conceptual strategies deployed in *The Language of New Media*. Considerable focus is directed towards the idea of time as an element – amongst others – of the "spatialisation" techniques of new media. Rune Dalgaard's paper addresses the theme of digital spaces and navigation by taking a closer look at the notions of 'database logic' and 'navigable space' in *The Language of New Media*. Finally, Morten Breinbjerg discusses the aesthetic consequence of digital sound being both a string of symbols in the computer and an object of a phenomenological investigation.

About Lev Manovich

According to the Russian-American computer researcher Lev Manovich, we have developed cinematic ways of seeing the world since the end of the 19th century. We see the world through a camera, or, more correctly, we see the

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world through its thousands of cameras.

In his already classical book, *The Language of New Media* (The MIT Press 2001), Lev Manovich offers a new view on theory of new media by using existing concepts from film theory, art history and literary theory. According to Manovich, two fundamental principles can be identified: numerical representation (the idea that all media objects are subject to algorithmic manipulation) and modularity (the idea that any media object can be copied into or added to another object). From these principles a new computer culture, a blend of human and computer meanings, can be derived.

In his book Manovich focuses in particular on interface (the language of the screen), operations (e.g. digital compositing), and digital illusions and forms (e.g. the database form replacing the traditional narrative form).

Lev Manovich has recently illustrated many of these observations in his Soft Cinema art project by means of a short book, a website, and several exhibitions, demonstrating the principle of the database form in different exhibition environments and in a Mondrian-inspired split-screen web format.

Space in New Media Conception — With Continual Reference to Computer Games

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*Abstract: This contribution, partly philosophical and partly practical, challenges the notion of space (and time) in new media conception such as it is outlined in Lev Manovich's seminal book *The Language of New Media* (2001) by testing it against other notions and representations of spatiality. This leads to a discussion of computer game spaces and the way they remix earlier media. It is argued that computer game spaces can be seen as the subtle result of Renaissance geometry, topological space in Modernism, and the moving images of cinematography.*

Keywords: New media, computer games, space and game space, philosophy of space, art history

INTRODUCTION

In a reading of the Berlin-based ART+COM multimedia work *The Invisible Shape of Things Past* (1997), Lev Manovich notes that this artwork, or this particular “cultural interface”, in following “the general trend of computer culture towards spatialization of every cultural experience”, “spatializes time”. It does so, we are further informed, by “representing it as a shape in a 3-D space” (Manovich 2001: 87). ART+COM's medialization of cinematography maps historical films of Berlin “into new spatial structures that are integrated into a

3D navigable reconstruction of the city".¹ Interestingly enough, ART+COM seems to pay tribute to avant-garde art forms, most notably the 1960s Situationists and their idea of reconfiguring urban spaces. Additionally, this reconfiguration is witnessed every hour and every second in the 'webification' of Potsdamer Platz, i.e. the subtle interplay of web-cams, panoramas, corporate buildings, and multinational media houses.

As another example, Manovich presents the software developed by Steve Amber, which enables the user to "map" a feature film into a matrix of still images where each image represents a shot from the film. "Here time is mapped into space"², Manovich concludes. The art projects of Amber and ART+COM can be seen as *mapping* strategies in new media, which also points to what Manovich refers to as *meta-media*: objects that contain both language and meta-language, i.e. "both the original media structure (a film, an architectural space, a sound track) and the software tools that allow the user to generate descriptions of this structure and to change this structure".³ Meta-media are, in a manner of speaking, bones and skin in one.

In the following, I shall contextualise these quotes and use them as a background for challenging the notion of space (and time) in new media conception such as it is outlined in Manovich's book *The Language of New Media* (2001) by testing it against other ideas and interpretations of spatiality. This will lead me to a discussion of computer game spaces and the way they remix earlier media. Overall, my critique can be rendered into an explicit interrogation: *What kind of spatial model do we speak of when we claim that temporal forms are indeed mere representations within an overall - cultural as well as technological - spatialization trend in new media strategies?*

SPACE AS FORM – SPACE AS REPRESENTATION

What is space? It is incongruous to believe that one effortlessly and incidentally

1 Lev Manovich: "The Anti-Sublime Ideal in Data Art", www.manovich.net.

2 Ibid.

3 Ibid. See also Lev Manovich: "'Metadating' the Image", www.manovich.net.

could answer such a highly complex question. First of all, philosophers, scientists and artists have been debating this issue for thousands of years. In his mytho-rational philosophy Plato deemed space to be of lesser value than time, since time, at least, is a reflection of eternity and therefore of form itself. In Greek natural philosophy space is merely a frame, which environs an object, or, as it were, the place for a thing. When you 'carve' out this thing by cutting out place from space, you get a rupture in the representation of eternity. Time is not, however, that which directly connects space to eternal forms and thereby prevent space from falling apart when it is otherwise occupied by places and things; rather, time is an incomplete echo, a representation of recollection, which mimics the mundane form that is already a copy of a copy.

Much later, Kant declares in furtherance of Newtonian laws of gravitation and ideal geometry space an absolute entity, even if he simultaneously reveals its latent brittle eminence. In *Kritik der reinen Vernunft* (1793) he argues that space and time are the perception forms - or modes - of reason (*Verstand*). One 'thinks' with these forms, but one cannot transgress them. This is to say, one cannot turn them into objects of a 'pure' philosophical enquiry. To Kant space is consequently both the underpinning and curb of reason. If space is indeed a kind of optical machinery that we use in order to observe objects and relations *within* space (that Kant thought of as a Cartesian grid), then the Kantian dilemma exactly consists in the paradoxical fact *that we cannot observe the conditions of our observations*. We do not have access to the optical machinery as long as we - knowingly or unknowingly - use this machinery. The problem is that we always deploy this machinery - even when we assumingly try to surpass it by observing it as an object (Walther 2003c).

Secondly, it seems that space is not a 'pure' concept at all, since it is connected with time.⁴ This interweaving of categories can be registered in common physics as well as in everyday language: we utilize temporal metaphors with the intention of describing spatial topics. Temporalization is that which

4 Thanks to Dag Petersson for stimulating conversations on this topic; cf. also his unpublished essay "Silver and Silicon - On Actualization of Time in Chemical Photographs and Digital Images".

donates a certain dynamics to space; time is space dimensioned; time is that which ensures a trajectory through space; time is precisely that which enables navigation. Time provides space with depth, relations, and maybe - some would assert - it assigns narratives to space. Whenever there is space there is a story, since - and this would be the argument - space needs to be perceived not only as an available abstract plane of coordinates but also as a set-up for lines and trails that move in time. Even later, Einstein challenges this view in which space is primarily conceived as synchronized representation. In his special theory of relativity, Einstein delivers a precise report of contingency that numerous painters and authors have portrayed during the 20th Century. In fact, it was one of Einstein's contemporaries, Henri Poincaré, who similarly launched an assessment of rigid space conceptualization that apparently turned Duchamp away from painting and into functionalism. Space, that was earlier rationalized as a coordinated medium of continuity and endlessness becomes now, in the hands of Einstein and modern physics, a secondary facility that is inevitably attached to the system - i.e. the point - of observation, whereas the speed of light is the constant of the universe.

Thirdly, space differs depending on whether we look at it from a human angle or from a strictly mathematical angle. The mundane space that a human subject inhabits is not by nature geometric; rather, it is structured in accordance with matter-of-fact actions. In such a spatial environment, various orientations are related to directions - practical vectorizations - places, ranges of space, and things, in contrast to dimensions, points, lines, and absolute objects. The space of action is a praxis-architecture - a phenomenological space, one might call it - that does not involve length, height, and width, but instead territory, proximity, and distance.⁵ A personal space centres on equipments and relations that are required to institute qualities of meaning, whereas a geometrical space is incessant and unbounded. The space of every day life is *heterotrophic* in its design of multiple layers by which it constantly

5 I draw on Arno Victor Nielsen's essay "A Space Odyssey" in this passage (Nielsen 1996).

See also Bøgh Andersen 2002 where he distinguishes between three types of spaces: physical space, accessibility space, and conceptual space.

confronts its user with a surplus of potential strategies of spatial couplings. The space of mathematics is *isotropic* in which all matter and every coordinates are evenly spread in all directions. Thus, when a human subject navigates through space it becomes *contingent* - where to go next? - and *intentional*: the use of space through motives and affects. Following from this, my assumption is simple: it is Einstein, Poincaré, and Husserl that paved the way for the computer games of the present era.

Navigable space – computer game space

Now, in order to illustrate this duality embedded in our conception of space we can point towards the computer game as an example of “navigable space” (at least if we consider games after 1992). Importance should be placed on the fact that a game space projects both a semantic and a mathematical space. The game space is constructed - it is made up of polygons, object relations, textures, rendering strategies, etc. - and, at the same time, it is ‘nothing’ without the presence of the user within this represented world. The game space is the result of numerous mathematical calculations, but it is furthermore a space that exports meaning and is open for meaning.

In *The Language of New Media* Manovich talks about the “navigable space” of the computer game where “narrative and time itself are equated with movement through 3-D space, progression through rooms, levels, or words” (Manovich 2001: 245). Again, we are confronted with a general new media trend - that of spatializing temporal forms. Manovich goes on to compare *Doom* and *Myst* and claims that whereas the player in *Doom* moves in straight lines, “abruptly turning at right angles to enter a new corridor”, the navigational structure in *Myst* is much more open and liberated: “The player, or more precisely, the visitor, slowly explores the environment: She may look around for a while, go in circles, return to the same place over and over, as though performing an elaborate dance” (ibid., p. 244f.). Yet the two games are basically identical since they are both “spatial journeys”:

Navigation through 3-D space is an essential, if not the key, component of the gameplay. *Doom* and *Myst* present the user with a space to be traversed, to be mapped out by moving through it. Both begin by dropping the player somewhere

in this space. Before reaching the end of the game narrative, the player must visit most of it, uncovering its geometry and topology (ibid., p. 245)

However, I do not entirely agree with Manovich's classification. First, there is a larger degree of visual and spatial variability in *Doom* than in *Myst*. In the latter the user's relative independence in terms of vision and motion is limited to 45 and 90 degree pans - or, rather, cuts between 2D graphics - and the unimpeded exploration that has otherwise been ascribed to *Myst* (cf. Bolter 1991) is partly an illusion because the user is forced to follow certain pre-programmed paths within the game (cf. also Pold 2001). Secondly, the artistic openness that Manovich observes in *Myst* is not connected to the navigational potentials of the user. Rather, it is present because the player has a vast amount of *time* at hand to explore the game world, and because the narrative plot seems to *demand* the player to waft out into the picturesque branch points and grey zones of the *Myst* universe.

In contrast, *Doom* is condensed to the here-and-now story of the user: a fast tracking through space. Espen Aarseth comments upon game spatiality:

[Myst] presents a graphical "click'n'go" interface over the classical adventure game structure: explore the paths, solve the puzzles, and win the game. The representation seems three-dimensional, but consists of a network of still life pictures, with "hot spots" that the user clicks on to "move". What seems like an outdoors game is very much of the indoor variety: discontinuous, labyrinthine, full of carefully constructed obstacles. What looks like an open area is really a closed labyrinth with a few possible directions, indicated by the stairpaths. (Aarseth 1998).

It is true that contemporary computer games present themselves as navigable spaces in which the trajectory of time is integrated into spatial journeys. Nevertheless, we must not overlook that this 'inclusion' of time - the subordination of time onto 3D space - behaves differently in shooters and adventure games. Let me briefly explain this supposition:

In general, the creation of new and powerful game technologies is correlated with realistic renderings of textures in 3D spaces by using real-time based motion procedures that are represented relatively to the user's perspective. There are basically two ways of doing this: In *binocular parallax* the user's vision (and, of course, the body) is tied to an exact point in space.

The optical performance can easily be experienced by focusing on a spot in front of the eye while the other eye is covered - and vice versa. What happens is that space itself seems to move! More advanced is *motion parallax* that simulates the fact that body movements create different visual inputs (Qvortrup 2002: 10). Actually, computer games simulate this simulation technique: when playing a game it is not the physical body movements themselves that modify the game space (that would be genuine VR); rather, it is the *represented* body, i.e. the corporeal viewpoint, which is transferred into the game's space.

3D shooters such as *Doom* and *Duke Nukem* suffer from visually imperfect textures (which are easier to render than bitmap images and high-polygons) and, at times, flickering depth perception. These games favour the freedom of motion feedback over image depth and photorealistic neutrality. The *Half-Life* modification *Counter-Strike* exploits to a large extent textures as a cover-up for geometrical forms, and the so-called 'blurring' that is produced by photo technical distortion, sharpening of edges, use of patina, etc. is far from realistic. Similarly, the central perspective in the game (or, rather, in the copious *maps*) is basically accurate, but the manufacturing of shadow effects is rather simple, and the texture gradients are reduced to blurring (Kolstrup 2002: 251).

Yet, the consistency of computer game spatiality not only bases itself on the capacity of the 3D engine, which is the 'motor' that quantizes ('calculates') the images on the screen as well as renders them (i.e. by 'moving' them). The consistency is further tied to constituents of *genre* and hereby intimately related to the user's expectations prior to the game. Take adventures as an example: *Grim Fandango* is not realistic and action packed like the current successor of *Doom*, *Doom 3*. The former game primarily consists of static, cartoon-like scenes. When the avatar, Manny, enters a new location within the "Land of the Dead", the game immediately switches camera mode, lightning angle, and architectural structure. Indeed, modern adventure games are much more attracted to mood, graphical richness, and narrative complexity than to the user's physical presence, real-time rendering, and the facilitation of simple conflict schemes. Thus, the crucial aspect of space representation in adventures

becomes the constant and 'natural' transformation of centre and periphery in the depicted game world. The entire aesthetic effect is based on this realistic potential of transformation, which is obvious in games like *The Longest Journey* and *Myst III: Exile*.

A typical action game struggles with the fact that the user's orientation in the 3D space is established using central perspective and not through the singular textures that one encounters during the spatial journey. In *Counter-Strike*, the player needs to navigate quickly in space. Where are the snipers; where is the bomb located; will the competing team reach the target before us? That is why the space in *Counter-Strike* is not crammed with niceties and interesting objects - and if they do exist it is likely because they serve a functional role: The user can climb up the ladder and get a better view of the killings at hand, or he may hide behind the wall of a run-down country house and slowly sneak in on the terror unit. In adventure games, it is the other way round. Here, constant orientations within space are not the average requirement. Spaces in *Myst* and *Riven* are highly complex - so what one does is draw a map, learn about the structure of the landscape one is traversing, and enjoy the details.

However, this mapping of spatial information is grounded in a functional desire for control. Playing *Myst* is not just about envisioning and seeing the sights of a remarkable world. Also, and more decisively, the player's desire to uncover the 'secret' structure underneath the surface is triggered, tracing the atlas behind the puzzles.⁶ As Guattari puts it: "We're strict functionalists: What we're interested in is how something works, functions - finding the machine. But the signifier is still stuck in the question 'what does it mean?'" (Guattari, in Deleuze 1995: 21f.).

Space perception – art – computer games

But what is a computer game space? In addition, how did it come about? I would

⁶ See Walther 2003a for a more detailed discussion of the relation between structure and experience in play and games.

like to propose that an emblematic 3D game spatiality combines the features of Renaissance painting as well as those deployed by the topological geometry found in Modernism. Allow me therefore to highlight a short history of space representation (Walther 2003d). Needless to say, this is not the average computer games lineage (cf. Walther 2003c).

From ancient Greece, Roman painting, and Giotto's medieval techniques we are aware of how perspective, space, light, and planes can be skilfully manufactured (Gombrich 1982). However, it is not until the Italian Renaissance and the invention of the central perspective that spatialities, which simultaneously depict realistic panoramas and create imaginary worlds, are made operational in the modern sense. Masaccio's *La Trinità* in Florence from 1425-26 is considered the first piece of art that is based on an entirely correct, mathematical conceivment of space (Qvortrup 2003: 64). The specific painting method described by Leon Battista Alberti in his famous *Della Pittura* (1435) consists of the interconnection of orthogonal lines within the image so that they all crawl into own point: the vanishing point. By stretching the lines further both symmetrically into the picture and outwards to the viewer/painter, a geometrical relation is created as if the viewer/painter were part of the scene and as if what they were seeing were the three-dimensional relationship that would be seen with the eye (Hetherington 1999: 55).

Thus, the mathematical concept of *projective space* formalizes the elements that are put forward in Renaissance perspective. It is exactly this projective principle of a form's identity - for instance the identity of the dinner table in Leonardo's *Last Supper* (1495-98) - that vaporizes in the visual art form of Modernism. The geometrical principles that support figural compositions within the works of Klee, Magritte, Picasso, and Escher seem to be more fragile, bendable, and topological (Østergård 1999: 28). Take a look at Magritte's painting *La tentative de l'impossible* (1928). It shows an artist in the process of painting a nude woman *ex nihilo*, as if she were carved quite literally out of the canvas itself. Magritte's two-dimensional trick folds the representational and conceptual space into one, so that it becomes impossible to figure out the 'inner' and 'outer' form of the picture. This is a space representation that, in its ironical

portrayal of art's formal rationality, seems to locate itself in the midst of infinite spatiality and, at the same time, very close to a strictly territorialized space. The idea of endless space in Magritte is not imported from elements of Renaissance's ideal anthropocentrism in which man and the human eye are in the centre of things. Rather, it is a spatiality that folds layers of (representation of) reality into other layers; on top of each other, and next to each other - and hereby nesting forms within forms and strange loops. Think of Escher's drawings in this respect. Magritte evokes the essence of the 20th Century's pivotal negativity: that truth is hidden in the eye of the beholder, but that it does not make any sense to proclaim the foundation of this very visibility. In other words: space is deceitful. Space is not to be grasped *in itself*; rather, it must be *explored*.

Computer game spaces conclude this dense history of spatial representation. What one sees on the screen is obviously presented in the manner of Alberti's recipe. However, the projected game space furthermore entails a kind of n-dimensionality, meaning the computer's ability to juxtapose infinite layers and grids in a complex environment. The latter space one could label the topological geometry of computer game spaces, while the former, the Renaissance vanishing point, is the ideal geometrical game space. To put it briefly: the computer game space consists of both vanishing points and infinite layers. When located directly in front of a prototypical *Doom*-milieu, one is in a kind of 'Leonardo-mode'; the eyes quickly follow textures and paths only to observe a monster coming directly towards one's heavily armed torso. But, as all of this happens, space itself is constructed *on the fly*, it literally unfolds itself in the course of gameplay, as if one was painting the environment and routes oneself, and as if one was cutting and pasting the nude woman out of nothing in the work by Magritte.

Graphical game spaces move in time. Without time, there is no space. Space takes time. It takes time to comprehend space - and 'it' is in space (or: it is always already spatial). Furthermore, without time there probably wouldn't be any space to comprehend. Nothing occurs that is not in time, writes Kant in *Kritik der reinen Vernunft* (Kant 1998: 106ff.). Certainly, game spaces are

intriguing also because they touch upon cinematographic modalities. As such, they are "dynamic screens" (Manovich 2001: 96ff.). Such screens may be peepholes into depicted scenarios (as in Renaissance), but furthermore they convey images that change over time. The duration of time within geometrical space is of course also inherent in Renaissance art since the viewer's ability to gaze along the lines of the representation presupposes a dynamic space that needs time as its medium (i.e. time equals depth). However, with film and cinematography time, space, and movement become transparent with respect to each other. Though the spectator may not be moving himself (as in Virtual Reality), cinematography provides the illusion of portable perspectives. Not only do images move in front of the camera lens; the camera is itself mobile in relation to observation (Bolter 1996). Therefore, computer game spaces consist of vanishing points, infinite layers, and cinematographical movability.

In short: Renaissance realism + Modernist painting + cinema = computer games.

Tentative conclusions

With the arrival of the Renaissance painting time both as autonomous appearance and method of perception became entrenched within the representation. Speaking in a mesh-mash of cultural analysis and technological teleology, the geometrical construction of Renaissance is a snapshot of the time-image: it is time dimensioned; time understood and pictured *as space in space*. Impressionism and Modernism both criticize this ideal correlation of time-lines and space-perspectives - it precisely *takes time* to figure out the chaotic granularity of Monet's depictions; and an even more 'outrageous' deconstruction of steady geometry can be witnessed in the artworks of Magritte. In Renaissance time was build into the picture. In Modernism time point towards the contingency of observation. While the former spreads chunks of stories evenly across the uninterrupted lines of the representation, the latter problematizes the true origin of observation by lifting the 'uni-verse' of Renaissance into the 'multi-verse' of Modernism. Cinema, finally, instantiates both illusionisms.

What I am arguing for, then, is not that we should renounce Manovich's statement about the spatialization of time and new media's navigable space. However, what I do want to bring into focus is a view upon computer game spaces as 'perfect forms' because they synthesize central perspective, topological space, and cinematic motion. An interesting case study would be the software known as the *level editor* that - occasionally - comes with the games themselves, e.g. *Unreal-Ed* for *Unreal Tournament*, or the *Quake* editor that engines numerous games on the market. Working with a level editor is, as it were, an enterprise of continuous art history: One begins with the wire frames (Renaissance), add textures, light, angles, trajectory points, layers, etc. (Modernism), and, finally, a scene or a gameplay is brought to life through various cinematic motion and simulation techniques.

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Spaces of Navigation on the Web

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Abstract: This contribution will focus on the theme of digital spaces and navigation by taking a closer look at the conceptions of "database logic" and the "database as a cultural form" in "The Language of New Media" (Manovich 2001). Lev Manovich claims to identify a difference between the logic of new and old media forms based on dichotomies such as database-narrative. In what ways are such dichotomies furthering our understanding of digital media forms (new media objects) such as the web and in what ways are they confusing apples and oranges? This entails a discussion of the implicit claim that the relation of narrative and database (collection) is a one-to-one relation between two competing principles of organization. Finally, the notions of mode-switching and node-switching are suggested to characterize the experience of navigation on the web.

Keywords: New media, theory, narrative, database, navigation, switching

INTRODUCTION

As readers of *The Language of New Media* will know, the book comes heavily loaded with ideas on the computer as a medium and its relation to our forms of representation and communication. As it is not possible to deal adequately with all of these here, my contribution will mainly address the argument that the "database" as a cultural form is a paradigmatic form of the so-called digital age. While this limited focus will not do justice to the wealth of themes in *The Language of New Media*, it does, however, address one of the central claims of

the book. Particular emphasis will be placed on the website and the web more generally as these phenomena are some of the most culturally pervasive and therefore powerful examples that Manovich bases his arguments on.

Before proceeding further, however, a few words to place *The Language of New Media* in its proper theoretic context are necessary. Among the various fields that Manovich draws upon (and contributes to), I want to emphasize a perspective on media that is usually dated back to the work of Harold Innis (1950, 1951). Innis inspired writers such as Marshall McLuhan, Elizabeth Eisenstein, Walter Ong, and many others, who in different ways focused on the cultural significance of speech, writing, printing and analogue electronic media. This cluster of theories are interchangeably referred to as "medium theory", "the toronto school" or "media ecology". The common ground in these works is, to paraphrase Manovich, the non-transparency of the medium - the medium in other words is not transparent or neutral to the message.⁷

With the advent of the computer and especially after the widespread use of the net in the 1990s, various people have rethought this body of theories to address the cultural significance of the computer as a medium. Dating back to the 1980s, theorists of digital culture such as Jay Bolter, Michael Heim and Mark Poster, to name a few, have written on this subject, although specific attention to the net and the web first followed later.⁸ Of these earlier works, *The Language of New Media* most directly shares its focus with the work of Bolter on hypertext (1991) and the later idea of remediation (1999).

In my view, *The Language of New Media* makes two significant contributions to this cluster of theories. The first is the attention to the visual

7 Manovich talks about the non-transparency of the interface (see p. 64) by analogy with 'non-transparency of the code' in cultural theory, most notably in the extreme version of the Whorf-Sapir thesis. Yet, as implied, he is also drawing on a media theoretic tradition, where the non-transparency of the interface is a sub-dimension of the non-transparency of media in general.

8 Mark Poster focuses most explicitly on the net in his *What's the Matter with the Internet?* (2001) - for a critical review see Dalgaard (2002). Bolter mostly touches upon the net in Bolter & Grusin (1999).

qualities of the interface, most notably the screen and the use of windows. Manovich succeeds in bringing the cinematic perspective and attention to visuality to bear on these interface forms without the reductionism that sometimes characterize the medium theory perspective outlined above. In that tradition even recent media transformations tend to be conceptualized within the dichotomies of text-image and text-orality, as media are seen to favor one side of these dichotomies on behalf of the other. Yet, the computer has proven to be a medium that does not fall easily on either side of these dichotomies, as it remediates both textual, pictorial and oral forms of communication in ways too complex for general dichotomies of this kind. The view of media and media forms as competing directly with each other, while not subscribed to by Manovich in this particular case, does resurface later in his description of the database and the narrative as two competing forms that will be addressed below.

The second contribution lies in the attention to the net and more specifically the web - a dimension that for historical reasons is lacking in the otherwise related writings on hypertext by Jay Bolter and George Landow in the early 1990s. I would like to focus on this dimension of *The Language of New Media* - the emphasis on the web and information access - which I believe runs as a thread throughout the book. The assertion that "information access has become a key activity for the computer age" (p. 217) is closely related to a perception of the World Wide Web as a prototypical and culturally pervasive form of new media. Therefore it makes good sense to take a closer look at how Manovich characterizes the web, not least how it is connected to the idea of the database as a symbolic form.

The Database as the Symbolic Form of the Digital Age

While the notion of database extends beyond the web, the web plays a major role in the argument that the database can be regarded as the cultural form of the digital age. When Manovich uses the term database and with reference to Panofsky talk about the database as a cultural form that structures "our experience of ourselves and of the world" in a new way, he is most often, if not

exclusively, thinking about the web.

”Following art historian Ervin Panofsky’s analysis of linear perspective as a “symbolic form” of the modern age, we may even call **database a new symbolic form of a computer age...a new way to structure our experience of ourselves and of the world**. Indeed, if after the death of God (Nietzsche), the end of grand Narratives of Enlightenment (Lyotard) and the arrival of the Web (Tim Berners-Lee) **the world appears to us as an endless and unstructured collection of images, texts, and other data records, it is only appropriate that we will be moved to model it as a database.**” (boldface added) (Manovich 2001: 219)

The web, as this quotation shows, plays a central role in the arguments presented by Manovich. The comparison of linear perspective as a symbolic form of modernity with the database as a symbolic form of the postmodern computer age bases itself on positioning the web as the predominant example of the database form. The web, in other words, is defined as a database but the notion of the database is also largely defined by the web. It is the web as a cultural form, which is placed alongside the theories of Nietzsche and Lyotard and the web, which is regarded as a metaphor and model of how we experience the world. The passage quoted here contains some rather bold assertions with respect to the epistemic significance of the web and the references to Nietzsche and Lyotard⁹ would have been served by further elaboration. However, we shall leave these issues and concentrate on the characterization of the database form and the web, which are the base of these suggestions.

Specifics aside, it makes sense to view the emergence of the web as a new form of “collection”, a database, that may mark a new paradigm of knowledge. It is unquestionable that the web presents us with a new media base for our collective memory, and that the issues of information access, navigation and selection are highly relevant in this context. Theorizing this situation is a challenge but some critical remarks are in place concerning the interpretation

⁹ There is a particular twist to the mention of Lyotard as his essay on the postmodern condition (1979) contained a view on computers and databases as control technologies which imposed structures and increased centralized control over information rather than being unstructured and chaotic. This more rigid understanding of the computer as a control machine and an automata was shared by many in the 1970s and 1980s.

Manovich proposes, especially with respect to the database-narrative dichotomy and the portrayal of the web as "unstructured" and without hierarchies.

Database vs. narrative?

First, it should be noted that the notion of database as used by Manovich here and elsewhere is deliberately very broad, meaning basically a (digital) collection of records (be it documents, numbers, images or whatever). Also, whereas the notion of database has often been associated with highly structured data and efficient mechanized data retrieval, Manovich emphasizes qualities such as random access and freedom of choice. This notion of the database is based on the proposition that we contrast the database form with narrative, which is argued to be the dominant cultural form of print and cinema. The latter creates meaning by the principle of sequential ordering of elements, which is also described as a syntagmatic principle. The former in contrast, does not privilege any particular sequential ordering but invites navigation by the logic of selection between elements within a paradigmatic set of options.

I have no real quarrels with these distinctions between database and narrative, although one could argue that the use of computer terminology (database) blurs the fact that the notion is so general that it is indistinguishable from the word *collection* - perhaps that notion would have been more appropriate. The real problem, however, lies in the fact that the relation of collections (databases) and narratives is easily obscured when they are treated as competing cultural forms operating at the same level.

In the vast majority of cases both on and off the net, the collection or the database form is a metaform with respect to narratives and other forms of expression. The library, for example, is traditionally a metaform that organizes its collection of narratives - but nobody claims that the library competes with the book. In the same manner, most websites are collections of links, documents or images that do not take the place of narratives but operate at the meta-level of organization and navigation with respect to the primary level of narratives or other forms of communication.

Why then, I wonder, is the database form defined and studied in opposition

to narrative instead of in relation to pre-digital forms of collections such as libraries, museums and archives? Is the digital collection or the database not primarily a transcoding - or, as Bolter would put it - a remediation of these forms?

As argued elsewhere, I think it was a mistake of early 1990s hypertext theory to believe that the hyperlink would kill linear narratives and replace it with non-linear forms of books.¹⁰ As it turned out, the cultural success of the hyperlink came with the web revolutionizing the collection much more than the narrative form. I wonder whether the database-narrative dichotomy is not repeating this mistake by comparing apples and oranges. The problem is not the contrast of narrative principles with principles of a random access database in themselves, such comparisons can teach us about both type of phenomena. Rather it is the cultural analysis that bases itself on the assumption that these are competing principles of organization operating at the same level and performing similar cultural functions.

I would welcome, in other words, more on the web as a collection or perhaps a network of collections, compared not to the narrative but to other historical forms of collections. What, for example, are the conditions of information access and selection of materials on the web compared to museums or the art system as such? Or to libraries, catalogs and classification systems? Do we navigate these forms differently when they migrate to the web? While these questions are not addressed in much detail in *The Language of New Media*, Manovich does offer some relevant ideas on the order of the web.

The order of the web

As Manovich observes, the web has often been portrayed as a giant book or a giant library. A weakness of these characterizations, as Manovich rightly points out, is that the web shares neither the narrative progression of books (read novels here) or any single overarching ordering system as a library does. Instead, Manovich portrays the web as "unstructured", "flat", "hierarchy-less" and

¹⁰ See Dalgaard (2001) on the role of hypertext in scholarly archives and collections.

"infinite". These notions are widely used in interpretations of hypertext, the web and the internet and form part of the ideology surrounding the notion of network. Again, while there is something to be said about hyperlink networks such as the web, the dichotomy that is constructed here is problematic.

The absence of one overarching order on the web is not the same as the absence of order as such. There is plenty of order on the web, it is just not one single unified order but a multiplicity of orders in many layers and overlaps. Just about every single website you can visit exhibit hierarchic principles of organization, usually ordered around the main page of the website. While the web does not follow one common principle of classification or subsumed to one single body of editorial control - there is still plenty of editorial control around the web. I would like to suggest that we characterize the web as a network of overlapping hierarchies and orders, created by the various collections, indexes and orderings that websites and search engines offer. Comprising all these local and partial orders in a macro-system, we have the web. As a global collection it is neither a library nor a flat unstructured space, but a second-order system - a collection of collections or an archive of archives.

If there is any general condition of information access connected to the web, we must expect it to relate to the task of navigation within a multiplicity and not an absence of structures. Rather than appearing to us as "an endless and unstructured collection", it is a system with many edited structures that a user or seeker must learn to switch skillfully within and between.

Switching, perhaps, is a suitable characterization for the mode of navigation that the web invites. First of all, there is the ever present modal switching between "reading" a node and selecting a link - the reading-selection switch.¹¹ This form of switching is not unknown from print media, where using an index involves a somewhat similar mode-switch. Yet, it is augmented radically with the active hyperlink, as the possibility of making a modal switch is

¹¹ Finnemann 1999, has introduced the concept of modal switching to characterize hypertext works as a particular genre but also more generally to characterize hypertext systems as a genre. Here it is used in the context of the web and more generally about navigation that transcends the individual work.

always present as an integrated part of the node (the webpage). A second dimension of switching is the node-switch, that results from making a selection. This is the switch from one node to another, and thereby from the semantic context established by one webpage to another. This can be a trivial jump from one page to the next in a sequential text, but it can also be a jump between levels in a classification system, a jump between two collections, a jump from one text to another by a reference and so forth. This kind of switching is highly different in what Manovich calls art objects, where it must serve an aesthetic purpose, and in the meta-structures organizing art objects, where it serves navigational purposes of more informative nature. While identifying general and shared dimensions as the database/collection idea does is important, differentiations that take into account genre and content dimensions needs to play a prominent role too.

As many media forms are brought together on the web, either as formerly dispersed collections or as independent link-collections, this form of node switching has accomplished unprecedented reach compared to earlier media. If we consider the web as one of the more prominent examples of digital media as cultural form, perhaps the notion of switching would be a good starting point for a further understanding of this evolving global collection?

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Sound in Digital Media: Symbol or Phenomenon?

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Abstract: In all artistic domains, digital representation dissolves the material of the artists into a soup of binary data. The materiality of oil paint, the slippery feeling of clay and the granular surface of stone disappears in the computer. Instead, the artist is seated in a pixel space, working with polygons and rendered textures, with symbolic manipulations on all levels. In music, however, it seems to be the other way around since new media allows the composer to work with sound as a material, by disregarding the note-symbol. This, in opposition to the understanding of the computer as a writing machine, ends the era of the literate composer.

Keywords: the literate composer, the sound object, representation of music

INTRODUCTION

As a musicologist, I will argue that new media, in the domain of computer music composition, constitute two artistic paradigms: the Media-poetic and the Media-aesthetic. The Media-poetic paradigm enhances the literate tendencies in music composition inherited from the use of note symbols in western classical music. Today the composer organizes music on all levels, from the individual samples of the sound file to the overall form of his work, by formulating algorithmic procedures governing the manipulation of digital symbols. In the age of digital media, music is programmable and hence subjected to the code.

The Media-aesthetic paradigm is historically connected to the invention of sound

recording. The possibility of representing sound in a form in which the representation (analog or digital) is almost inseparable from that, which is represented, means that sound has become an object for phenomenological investigation in the context of music composition.

My point is this: While we must acknowledge that the literate tendency is a prominent feature of digital arts, leading toward the Media-poetic paradigm and also, in a broader context, is compelling as a model for our understanding of digital culture and contemporary subjectivity, as witnessed by the description of the computer as a *Literary Machine* (Nelson 1990), a *Writing Space* (Bolter 1990) or as *Writing Machines* (Hayles 2002), we must be aware that a different artistic and cultural approach is strong, at least in the domain of music. Music composition has long been a literate practice and the newness in music, therefore, is not the symbolic description or the formalization of its components, but access to sound phenomena as a musical material. Despite its symbolic nature, digital audio recording ends the era, or at least the monopoly, of the literate composer (Truax 1992). This forms the basis of a new approach to music composition, based on a new auditory sensitivity, which springs from actually listening to the sound and not from the writing of it. This, put forward here, is the dominant feature of the Media-aesthetic paradigm.

NEW MEDIA

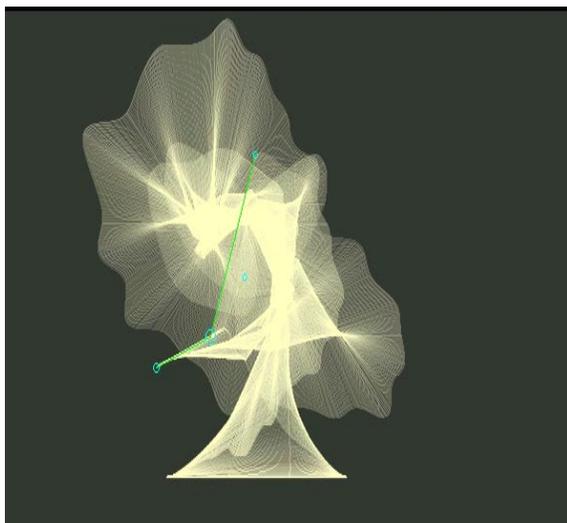
In his book, *The Language of New Media*, Lev Manovich summarizes the differences between old and new media by listing five principles: Numerical representation, modularity, automation, variability and transcoding. In this short paper, I will only comment on numerical representation and automation.

As a consequence of numerical representation every media object (pictures, graphics, movies, texts, sound files etc.) is organized as sequences of discrete numerical symbols in the computer. Because every new media object can be described formally, it is subject to algorithmic manipulation and hence programmable. This means that the artist can transform or generate a picture by writing an algorithmic procedure for the manipulation of digital symbols. In a sense, the numerical representation constitutes a new alphabet and the

different programming languages constitute the syntax for combining the elements of that same alphabet. Therefore, it can be claimed, that every digital picture is a result of the process of writing, as the Danish media theorist Niels Ole Finnemann (Finnemann 1998) has pointed out in his description of the computer as a symbolic machine. This applies to all phenomena that can be digitally represented, and a new sort of writing is enabled, since all new media objects are in some way texts; they can be written, rewritten and so on.

The literate artist

As a consequence of digital/numerical representation, the material of the arts disappears. What was previously in a material form is now in a symbolic form. Instead of painting a picture, the visual artist organizes symbols. He produces his work of art by writing a software text. In that sense, the artist expresses himself through the computer code, which raises the question whether the artwork is the code, the software text, or the picture generated by it. This question was central to the CODEDOC exhibition at the Net portal of the Whitney Museum of Art (<http://artport.whitney.org/commissions/codedoc/>) from which the picture and code below is taken. The artworks exhibited are dynamic in the sense that they change continuously because of user interactions and the recursive nature of the scripts behind them.



```
//SpringyDotsApplet.java is the main code for this applet.  
//It includes code to display the applet, handle user interaction,  
//and animate the 3 Dots object.  
  
//SpringyObject.java is support code that simulates  
//the behavior of springs and masses.  
  
//Bitmap255.java is a library that handles the drawing of trails on screen.  
  
public class SpringyDotsApplet extends Applet {  
    SpringyDotsPanel dotPanel;  
  
    public void init() {  
        setBackground(Color.darkGray);  
        setLayout(null);  
        dotPanel = new SpringyDotsPanel(size().width, size().height);  
        add(dotPanel);  
        dotPanel.init();  
    }  
  
    public void start() {  
        dotPanel.start();  
    }  
  
    public void stop() {  
        dotPanel.stop();  
    }  
  
    public boolean mouseDown(Event e, int x, int y){  
        return dotPanel.mouseDown(e,x,y);  
    }  
}
```

Fig. 1. Mark Napier CODEDOC, <http://artport.whitney.org/commissions/codedoc/napier.shtml>

Like the picture above music has long been written by the use of standard music notation. The composer writes his music and organises individual note symbols with different values of pitch, duration, dynamic and timbre in intervallic relations. Notation of music is both descriptive and prescriptive. As a prescriptive device notation outlines the structural relations between the musical parameters, as they are planned to unfold in time. As such the score is a text produced by the composer, which he passes on to the musician. It does not change over time although it can be interpreted differently.

Pitch and duration, the primary parameters of western classical music, can be described formally/mathematically since they are organised in equidistant scales allowing each individual value to be expressed as the sum of smaller equivalent values: The diatonic interval is the sum of two semi tones, the minor third the sum of three semi tones. The length of the quaver is the sum of two semi quavers; the dotted quaver the sum of three semi quavers and so on. The relation between different values of both pitch and duration can, in other words, be expressed numerically. The introduction of electronic equipment in the early 1950's: sine wave generators, filters, amplifiers etc, allowed the composer to compose the secondary parameters as well. He was given the technological means to control and prescribe the timbre, in accordance to the mathematical Fourier transformation, which says that timbre can be described as a composite of sine waves with different frequencies and amplitudes.

In this sense, the composer, by the use of standard music notation and by formulating formal expressions for the parametric control of sound, prescribes the structure of the music. Therefore, the literate character of new media is not new when it comes to music, neither is the numerical description of its parameters. However, new media does refine the already established literate practice in the sense that the computer allows for the automation of music. Music is in other words programmable because of its already "formal nature". This led to an early introduction of computers in the 1950's in the algorithmic compositions of Hiller and Isaacson, by Yannis Xenakis among others.

My point is that the use of computers for algorithmic composition leads to a media-poetic approach, in which the composer prescribes the rules, and

formalizes the procedures for the organisation, as well as the generation of music, on both its micro and macro level. As such, it continues and enhances the literate character of traditional composition. Furthermore, the composer need not concern himself with the historical material in form of scales, instrumental timbres or even consider the natural limits of the performing musician. The material no longer exists a priori as a prescribed idiom. It is composed/generated during the process of composition since the intrinsic structure of the sounds, as well as the overall form of the music, arises as a consequence of rule based symbolic manipulations. This results in a new concept of musical material, described by the German composer Karl Heinz Essl in the following words:

The idea of an objectified material became obsolete not lastly through the discovery of self-organization in open systems and through the application there of artistic creation. The static object as incarnation of a timeless existence has been replaced by a temporally oriented, dynamic process of becoming. Accordingly, material appears not as something frozen, but rather as a potential which constantly regenerates itself in time and which follows its own inherent, constantly regenerating laws. (Essl 1994)

The key sentence in the statement of Essl is the expression "*dynamic process of becoming*" since it points to the fact that the currently celebrated use of chaotic systems in music composition, and other non-linear principles of organisation like agent based systems (Miranda 2002), leads to a new artistic approach that is currently described by the use of the word *Emergence*. In the context of music composition the Italian composer Agostino DiScipio speaks of a "*Theory of Sonological Emergence*" (DiScipio 1994) as a new musical paradigm. In a broader cultural context the American writer Steven Johnson uses the concept of emergence to designate contemporary culture in his newly released book, *Emergence* (2001). The uniqueness of "emergent music" (or "emergent culture") is that it has not been planned on a macro level. The composer formulates simple rules that once triggered and looped in the computer, allows for new global qualities to emerge - qualities that could not have been predicted beforehand. As with the previously mentioned picture of Mark Napier, the work of music generated by the use of non-linear principles is in a constant

state of flux. Thereby it reflects the dynamic feature of the media themselves. A feature that is expressed in the historical categorization of new media like Hyper Media or Dynamic Media and which is also present in Lev Manovich's concept of the database. In the context of the arts we can say that the artistic interest no longer concerns the form but the constantly emergence and transformation of the artwork - not the morphology of the artwork, but the morphogenesis - as a consequence of the code: the written software text.

The materiality of sound

While there is no doubt that the literate character of new media is compelling and important in understanding the nature of digital art this does not apply to the domain of music - here the newness of new media does not concern their literate character. Rather, it relates to the fact that the composer can work with sound without having to express himself through the manipulation of symbols. This sounds as a paradox, (and it is) since digital representation is basically symbolic. But it means simply that the resolution of digital representation, in comparison to standard music notation, makes it possible to think of sound as an almost physical object which the composer can access and "lay his hands on". As a consequence of sound recording the sound is divorced from its historical and geographical context. It is reified and no longer just a phenomenon in time. It is a phenomenon in space, and as such it becomes an object (a media object) for a phenomenological investigation.

This leads to a media-aesthetic approach to music composition, starting with *Musique Concrète*, initiated by the French composer Pierre Schaeffer in the late 1940s. The sound material is not generated by rule-based manipulation of symbols. The sound material exists a priori; it is already in the world. As a starting point for composition the composer analyzes the sound and therefore we can talk about a media-aesthetic approach exactly because the technology is the medium through which a new perception and acknowledgment of the sound is achieved. This involves thinking about sound and music not as formal structure but as texture. Music no longer resides in the intervallic relations between different note-objects but in a phenomenological investigation and

manipulation of its intrinsic features, that is, in the materiality of the sound object. That is why the British composer Trevor Wishart (Wishart 1993) has proposed sculpture and chemistry, rather than language of finite mathematics, as appropriate metaphors for what a composer might do with the sound object. The media-aesthetic approach to music composition brings forward a new audible sensitivity since new media enhance auditory perception, making it possible to listen to the world anew. This approach is not concerned with writing the music; rather it is concerned with “reading” the world of sound. That is, it is concerned with the world at a phenomenological level.

The media-poetic and the media-aesthetic paradigm

As pointed out in the introduction, we can speak of two paradigmatic approaches to music composition within the realm of new media. The first one is a kind of *media-poetic* approach where the music (the image) emerges as a consequence of algorithmic procedures defined in a formal language. The other one is a kind of *media-aesthetic* approach where the music (the image?) springs from the phenomenological investigation of already defined media objects.

While the first involves a shift from a symbolic to a phenomenological level, which allows the composer to write the sound and the music, the second, quite the contrary, takes its starting point from the phenomenological level, working with sound as a plastic material and thereby divorces itself from a literate practice despite the fact that it rests on a discrete symbolic representation of sound.

The argument presented here leads me to ask two questions by which I will end my paper:

1. Is this paradigmatic polarity unique for the domain of music or is it possible also to speak of a non-literate painter of computer images?
2. If so, what is the materiality of the artists in the domain of computers? To phrase it even broader: What do we understand by the concept of materiality in digital arts?

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