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Performing the Archive: Building Knowledge Space

The text introduces the concept of Wissenskünste (knowledge arts) as an interface between art and audience. For us, an important theme of knowledge arts is knowledge space or thinking space (Denkraum). The idea is to give participants a space to create knowledge from digital information through interactivity. But how to present knowledge in form of contextualised information as a visible shape? And even more complicated: how to visualize knowledge as a space to enter? Looking from a perspective of media art, this artists' presentation examines the notion of knowledge space by transforming digital archives as a space to enter – a space of Habitability.
With the notion of knowledge space or memory space, we develop a new kind of space by the superimposition of real and digital space. In this space of mixed realities a certain content is spatially displayed, which is interactively accessible for the audience. The interacting person experiences this audio-visual multi-sensory space as a producer of communication and knowledge. We understand this as a knowledge space - with refering to Aby Warburg – as new kind of Denkraum – a virtual Denkraum. Our thesis is, that this environment is a Dispositiv for the interplay of the senses, and for the visualisation and embodiment of knowledge, which is created through interactivity and by the individual. The staging of information structures and the procedure of interactive perception will be exemplified by the authors' own work of knowledge arts with online archives.

Introduction

Knowledge is understood as something that originates in processes of interacting with the world and is actively constructed by the individual. We are interested to create environments in which knowledge can be created, discovered or transferred. As new media artists we produce artistic installations in mixed realities of real and virtual environments. Inspired by art historian Aby Warburg and his notion of the Denkraum, we do research on the Virtual Denkraum and the aesthetics of staging knowledge space to enter. By knowledge space we understand physical space furnished with data. [1] Thus physical space transforms into a data landscape, an interactive environment to walk-in, through connecting data, space and the human. The visitor of such an environment is not only the protagonist, but also the producer of knowledge through interaction. For the human it becomes an enlarged action space that is experienced fourfold: by perception of the spatial (and other attendees), by exploration of data, by production of knowledge through active experience, finally, by the communication with others. In this article we introduce media art examples of staging knowledge, driven by different paradigms of interactivity – and as public space of knowledge. [2]

Interactivity as Aesthetic Experience

Notwithstanding, interactive structures remain the basic principle of digital media. Art historian Erkki Huhtamo [3] described the challenge "please touch" as the corner stone of the interactive art aesthetic, and as an echo of Marcel Duchamp's "Prière de toucher". [4] Touching an interactive work in the context of an exhibition is not only allowed, but necessary. Whether with mouse, trackball, touch screen, tangible objects, video camera, responsive workbench, virtual balance, the touch less Pointscreen [5] or other interfaces, the observer first brings the process into motion. This is very different to the appreciation of a traditional work of art. New media artist and theorist Simon Penny identifies the difference in perception as follows: "A painting is an instance of representation. A film is a sequence of representations. Interactive artworks are not instances of representation, they are virtual machines which themselves produce instances of representation based on real time inputs." [6]

Duchamp and others already discussed the active participant [7] in the first half of the 20th century, but with interactive media a new dimension of reversible art was introduced. In addition to the mental reception and bodily activities of observers, came a level that is related to other perceptions and processes. [8] The levels of activity and reception overlay each other. Those doing the interacting, influenced to a certain degree the appearance and therefore also the object of their aesthetic experience. Interactive art creates a situation or an environment, which the observer confronts, and through which they enjoy an experience, which arises only first out of the participatory process itself. Second it starts a communication between human, machine and other people. It is this repeatable process, which first gives the work its distinguishable identity. Interactive art thus means, the experimental exploration of artwork and tool. [9] This is why we see interactive art as artistic research and interactivity as an aesthetic experience.

Reviewing the history of media art, art historian Söke Dinkla reflected on our concept of Knowledge Arts [10]: "It's not about just one, but different forms of the arts. The plural "arts" qualifies our understanding of art, but at the same time extends it. ... "Knowledge arts" - in the 1990s we described them somewhat more categorically,

but also less openly as media art - are the result of the many coups, which visual arts in the course of the 20th century had undertaken." [11] Today, we find ourselves in a culture of active participants, of interactivity, in which the digital media "become identity giving machines. Thus the current challenge is to comprehend digital media as cultural technology," as Söke Dinkla points out. [12] Interactive concepts are based on an altercation with forms of human interaction, with communication technologies and with the possibilities of networked activity. In our artistic practice we create situations, which encourage forms of communication and interaction. Participants are able to extend the possibilities of interpersonal exchanges. In this way we change the modes of coming-into-contact-with-one-another.

Towards Space of Knowledge: Examples and Findings of the Authors' Works

The following projects show the attempts to build Denkraum models during the decade of the 1990th (until today), when the Internet has become a global brain. Originating from Computergraphics and real-time installations, after 2000 we were moving to the visualization of information. It is a movement from the virtual space of the 90s towards a relational space of mixed realities integrated into everday life.

Early projects like Home of the Brain, which got the Golden Nica for Interactive Art in 1992 or Murmuring Fields (1997) essentially present bodily interaction. The movement in virtual worlds of the '90s was a reading movement in hypertext. Interfaces such as the Semantic Map (2001) or the Virtual Book (2005) demonstrate a visually accessible “data space”. Media art installations in urban space, like Energie-Passagen, produced both, the audio-visual perception as well as a certain body mood adressed by orchestration of the senses and by realizing a real physically walk in data areas. The projects focus on the overlay of digital data spaces with physical habitat, which is a new situation of space and presence. Habitability of interface and interaction is of central importance. Therefore “Imagine space furnished with data” is a metaphor for the Denkraum as a space of the mixed realities.

The Virtual Exhibition: From Representation to Presence

The Virtual Reality installation Home of the Brain (1990-92) [13] reflects not only on the new medium, the media discourse itself becomes the theme of the virtual exhibition - a philosophical debate. The interactor „moves“ through the space that contains four houses in which the scientists’ and philosophers’ minds „live“: Joseph Weizenbaum, Marvin Minsky, Paul Virilio, and Vilém Flusser discuss their contradictionary view of the digital culture. Their ideas are represented as statements, “built” as virtual words and placed on an interactive virtual stage. The interactor is enclosed literally in the discursive virtual environment. With the aid of a data glove, one visitor at a time navigates through the 3D-environment visible in the data goggles. Other visitors see these images on a projection screen. They take the role of the chorus in ancient Greek theater by making comments, while the navigator becomes the storyteller. The theoretical discourse on new media as guided in books is outsourced to the virtual environment. Text fragments in Home of the Brain, such as "people are getting worse, but technology is getting better" by Vilém Flusser, or Minsky's metaphorical view, that there is no difference between the real you and your digital clone, form the narrative basis for the cognitive mood of the virtual space. The experience of this virtual discourse is borne by movement in the virtual environment. In comparison to the meta-discourse of many interactive works, Home of the Brain is properly talkative and allows with its few text sources (4 x 4 text fragments) already a complex arrangement and combination of substantive issues. In fact, navigation in Home of the Brain is movement in text,within a textile fabric of bits – so called texture maps and sound samples from the database. But how can online databases be used not only digitally virtual, but also physically as walk-in areas?

The Mixed Reality Stage: From Movement to Bodily Experience

The isolated space of mind in „Home of the Brain” is transcended through dialogic forms of play with other participants in „Murmuring Fields” (1997-99). [14] Spaces for data and action are combined using an invisible tracking procedure, a video camera interface, to build up a mixed reality stage. The stage is filled with virtual sound elements – philosophers’ statements. Movement in physical space triggers sound in data space. Movement breaks words into syllables and transforms into a sound collage. Two interactors produce sound samples. “Poli-tic-tic-tic”, says Flusser’s voice as soon as a performer moves around and thus interprets his original statement: “Boys and girls on the computers turn their backs to politics and turn to each other.“ The audio-visual installation is played like an instrument using body movement – the acoustic space is experienced bodily. Knowledge here is not acquired by reading, but through the body. The theorist of cognition, George Lakoff, emphasizes the importance of the body and its entity for thought processes. Sensory experience and reflection combine together in “sensory thinking of the body”, he writes. [15] Art historian Oliver Grau recognizes „Murmuring Fields“ as well as „Home of the Brain“ as new spheres of thought referring to Aby Warburg. Grau states that the works create a new type of a „Denkraum“. [16]

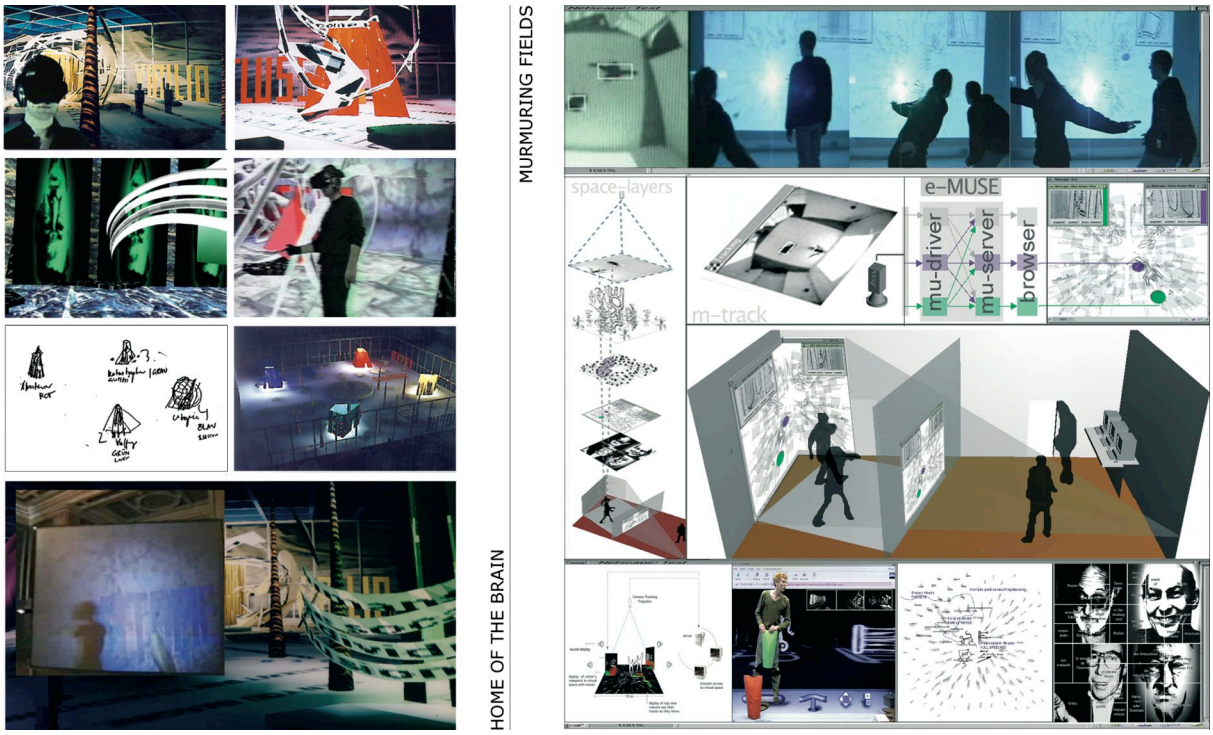

Fig.1 Assembling the interactive stage: Home of the Brain (1990-92) and Murmuring Fields (1997-99) © Fleischmann/Strauss

The central theme of Murmuring Fields is the development of a bodily notation system to experience knowledge space. Here communication is not face to face, rather it is emerging bodily interaction. It is a stage for the embodiment of individual experience in relation to the behaviour of the other participants. They experience themselves in reacting to the others. Orientation is not so much based on visuals but much more on acoustics – the Klangraum. Murmuring Fields provides a cognitive structure for the interplay and perception of gestures and movement of different participants in a situation where sounds and images are created. The movement creates the audiovisual sphere as a space for thinking in acting. The spatial arrangement of sound samples (from words, syllables and beats) allows for a seamless interwoven collage of sound and image, different to linear produced sound collages where sounds follow one after the other. It is because attributes of space and sound are directly connected. Figure 1 depicts the superimposition of different layers of expression – sound, text, image – and presents it as Hypermedia Storybook, a notation system of staging on the basis of a VRML script language (Virtual Reality Modelling Language).

A Murmuring Fields performance workshop at Fidena Festival in Bochum (1999) served as laboratory to identify the characteristics of the interactive process. Five steps of perception towards an interactive experience were discovered:
1. The participant tries to identify the structures and rules
2. The participant plays with the structures and rules
3. The participant considers what his action looks like / how it sounds to the audience
4. The participant becomes aware of the other player(s)
5. The participant tries out communication with the other(s)

The overlapping of the real and the virtual space creates a new legibility of information. In interactive systems the body reforms itself. Interactive media are time-based. This means that the action occurs in real time and the performers bring their own rhythm and their own subjective concept of time into the action. They can stop or alter the course of events at any time, and therefore structure perception themselves.

Staging the Information Flow in Urban Space
Another installation is about digitally mediated interactivity in urban space. Different to the popular notion of the media façade, which is a surface not a space, we were looking for social communication in public space supported by digital media. Our main interest is to foster emergent communication between people. With Energie-Passagen (Energy-Passages), [17] we realized an installation that reproduces the news by producing linguistic space for creating knowledge. Hundreds of catchwords, taken from daily newspaper appear as a visual information flow, projected onto the street, simultanously spoken by artificial voices. As soon as passers-by select a word, thematically related links become visible in the flow, which can also be experienced as an

audiovisual echo. Due to interaction the visitors „write“ anew „Living Newspaper“ by means of their personal choice. In the real sense of interaction the installation produces connections between the people. During four weeks runtime of the installation in the centre of Munich, the system builds a collective memory of the visitors' interactions. It confronts the most frequently used words of the newspaper with the most often well-chosen words of the visitors. While in the newspaper a kind of forcing into line is to be observed, the audience gets a voice and expresses own interests.

The work uses the energy of the participants and plays with concepts like fragmenting, forcing into line and censorship. The ranking of words used in the newspaper: Germany, Million, People. The words chosen by the audience: Victim, Love, Food. [18] The disparity of the language of the mass media and the preferences of the people becomes clearly visible. Sherry Turkle, MIT Professor of the Social Studies remarks: „The notion of a spatial experience of the discourse of the news within a city space and the possibility of deconstructing the newspaper captures the fragmentation of how media is experienced by citizens in a culture of simulation. It thus mirrors and concretizes an important cultural and political moment, turning it into an object for reflection.“ [19] Based on this experience our thesis is: Through interaction reading becomes a process of thinking in acting.

Fig.2 Energy-Passages – interactive installation in urban space, Munich (2004) © Fleischmann/Strauss

While many interactive artworks establish only a revolving meta-discourse around itself, Energie-Passagen initiates micro-discourses amongst the participants. They spin the stories continues, they fill the gaps of the interactive materials with their own meanings. Micro stories emerge. People are more than pure participants, they autonomously act on their own.

Knowledge Art as Cultural Technology

Interactive digital archives are current themes in media art research. [20] The difficulty of orientation in online archives is due to contents only being viewable on hundreds of individual web sites. Fundamentally, there are two different types of access to electronic data: the "precise" search and the "imprecise" browsing. The search presupposes that users know what they are looking for, that they can formulate their interests and, where necessary, can be more precise. Browsing, on the other hand, involves the user being inspired and prodded by that, which is offered. In the article "As we may think" (1945), the American scientist Vannevar Bush already bemoaned that the problematic relating to the selection of information was located in the artificiality of its indexing systems. [21] Data in archives were filed alphabetically or numerically. Information, if at all, could only be retrieved by sifting through, index for index. Bush observed that, "The human mind does not work that way. It operates by association. With one item in its grasp, it snaps instantly to the next that is suggested by the association of thoughts, in accordance with some intricate web of trails carried by the cells of the brain." [22] He called for a new relationship between the thinking person and the sum of our knowledge. Bush proposed mechanizing the selection of information using association - and not indexing. This idea of an associative net of concepts is also fundamental to the concept of "Knowledge Discovery Tools" of the online archive netzspannung.org. [23]

Navigational Map For The Data Domain

With the Semantic Map [24], we developed a navigational tool for the digital data domain of the netzspannung.org, platform for media art. It shows all the documents of the archive, rendered as self-organising clusters. This is done by an automated text analysis of the database entries. According to these textual relationships, the individual database entries are sorted relationally to one another within the cluster, whereby the distance corresponds to the relevance of their respective contents. If the documents are close to one another, there is a textual relationship. As soon as new documents are entered into the archive, they integrate themselves according to an automatic text analysis. The archive is therefore not "stipulated" but because the documents "have knowledge of each other" they can automatically re-order themselves. With the Semantic Map, hidden

connections within the data stock are computed and visualised. A self-organising neuronal network [25] is deployed for the computation of the data and the automatic graphic arrangement in the map.

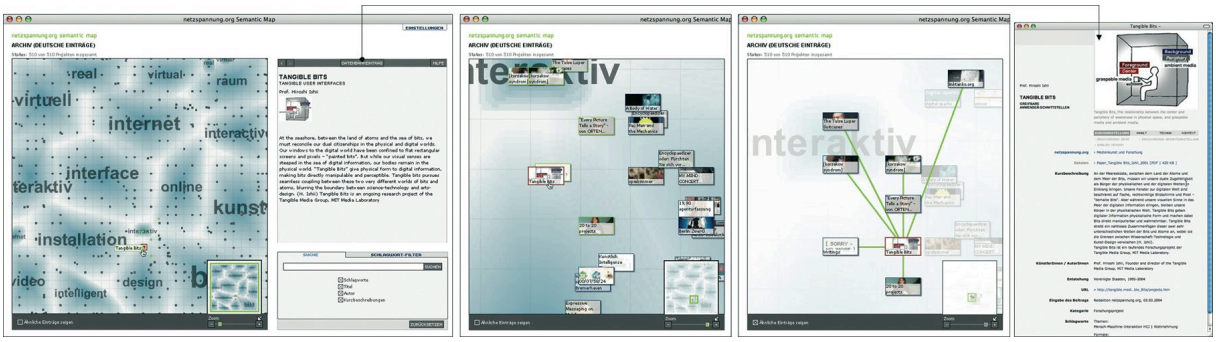

Fig. 3. Semantic Map: Dynamic zooming from simultaneous overview to detail (2004) © Fleischmann/Strauss

The Semantic Map has a few key qualities in representing the database. It enables for knowledge discovery: the user learns by browsing since it is semantically located information. Furthermore, the map offers visual orientation. And finally an intuitive search and dynamic zoom. The Semantic Map locates data, which is stored on the hard disc without relation to each other and displays the data as a visible and memorable image like a map. The user can navigate the data space in the same way he or she navigates physical space by using a GPS navigation system. The semantic knowledge map is a prototype of a visual search and find interface.

The Storytelling Archive: Time and Space Related Maps

Two other installations, which are interface environments, demonstrate how digital information can be staged spatially. Matrix [26] and Medienfluss/Media Flow [27] offer a complete overview of the netzspannung.org online archive on media art. The Matrix visualization is another kind of map to represent all database entries next to each other. The Matrix includes a virtual lens, which offers a quick insight in the database. It offers both a visual and a textual orientation through images and keywords. With the Matrix a browser was developed for exploring large stocks of data in combination with our contactless based PointScreen interface [28]. Each field of the Matrix, using an image icon, represents a media project. Smoothly the virtual lens is steered with a pointing gesture as if by magic, over the Matrix. The selected image enlarges itself and also shows a video on the project. The Matrix offers museums and archives the possibility of accommodating a greater part, or even their complete inventory.

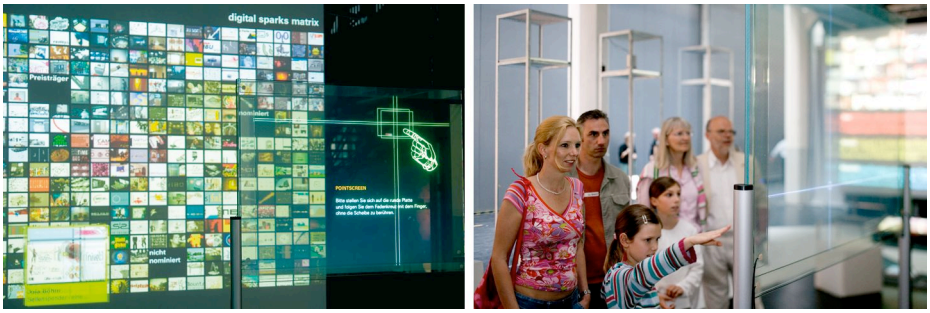

Fig. 3. The Matrix with PointScreen technology (2005) © Fleischmann/Strauss

The second interface environment, Medienfluss/Media Flow, transmits an immediate impression of the contents and number of documents in the online archive. Two parallel media flows of images and words, stream as large format date projections through the room. The flow of words shows keywords, authors and titles of the archived documents. The terms are spoken out by a computer voice using a text-to-speech process. The Medienfluss creates an atmospheric image and sound domain. A touch screen translates the flowing images into scrollable text bands, serving as an index for specific searching. On selecting a term or image, the relevant document is visually highlighted.

Another small screen of the public archive workstation presents the detailed database entries in the form of text, images or videos. Observers can watch the archivist at his or her workplace and follow the research. The installation offers two different levels. The one is aimed at the general public and affords an overview, whilst the other is addressed at experts, who wish to browse the archive. The floating interface is constantly reconfiguring, making the user find things he or she would normally never discover. Therefore the Medienfluss is also realized as an alternate web-interface to the netzspannung.org website. [29]

Fig. 4. Medienfluss [Media Flow] as a visual interface (2006) © Fleischmann/Strauss

Book Renaissance

The idea of the virtual book [30] has its origin in artists' books. We thought about how artistic work processes can be recorded? What notation system could be found for this process, which encompasses different media, and which runs over a longer period of time and is part of a team process? How can sketches, discarded and unfinished traces of thought, tones and images, calculations and codes, texts, images, sounds and videos be documented?

The Virtual Book expands the traditional book medium through hypertext, semantic analysis and the possibility of linking with other data sources to a cross-media interface. The idea of our Virtual Book is based on different approaches. First on preserving cultural heritage, e.g. rare and historic books and second on the idea of an interface that looks like a book for the retrieval of large amounts of information online and offline combined with future forms of filtering, storage, reading and annotation. The Virtual Book as a metaphor for a networked knowledge structure serves both as an interactive display of rare and valuable books, on the other hand, the Virtual Book as a tool and appliance for the production of new and actual digital documents in book form.

Our virtual book uses video, audio and hypertext linking, and is an extension of the traditional book. It can thus be read in different ways. It can be browsed and managed, page for page, like a traditional physical book. Integrated into the virtual book are also hyper-textual navigation elements and multi-media components. The text is saved and indexed in a database. The book can be consulted, or searched chapter for chapter, according to keywords and terms, authors, images and videos, using a menu. The virtual browsing and the images, which metamorphose into video or animation, are impressing for the reader. The MP3 audio track, reads out the text using professional narrator voices, and at the same time, marks the relevant positions in the text.

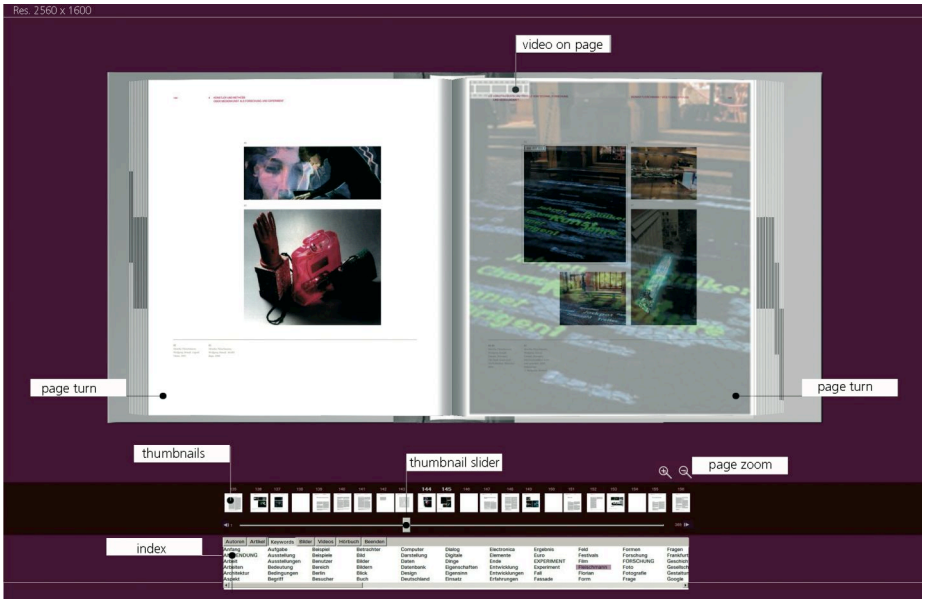

Fig. 6. Virtual Book. 2005 © Fleischmann/Strauss

Google books are great. One can read old and rare books online. But the book as aesthetic media format always shows a double side, while the Google book remains in the single sided view like a document. Does single sided reading change perception? Is there a new way of seeing? Our Virtual Book compared to the Google book

format allows new ways of seeing because of the semantically analysed body of information and its connectivity to other sources. It is an intelligent, interactive data source - not just a PDF file.

Conclusion: Deep Storage - Storytelling from database
Whilst in traditional art forms, packaging, stacking and storing were discovered as artistic form of expression, "the ever present digital date storage in the 1990s," led to, "an artistic altercation with the freeing, or rather ousting of the human memory." [31] The irritation increases over the loss of memory that is given over to machines the more knowledge can be relocated on hard drives. The machine today is not a single computer, but a global network of computers. The knowledge lost to individuals by relocation to this storage is gained through the compensations from the collective and the exchange. With the work presented, we relate digital storage to knowledge, memory and recollection. Our work is an answer to the challenge of the ever-increasing mass media flood of information. Since 1990, our thematic foci regarding interactive media have shifted. At first, questions of **body, recollection and memory** stood at centre stage. Afterwards, the increasing floods of information and **knowledge as stored information** took on a greater meaning.

With "Home of the Brain", we reflected not only on the new medium, but the media discourse itself became an object of our contemplation. The interactive participants were enclosed literally in the discursive environment, their field of vision filled in completely with a 360° illusionary immersion room. [32] This isolated immersion in "Murmuring Fields", is extended into a thought space through dialogic forms of play with other participants. The data room of the sound archive is played like an instrument using bodily actions, and so experienced bodily. The new experience is discovered through the joint play of the participants. The authors use the digital media, as Söke Dinkla remarks, "in order to newly structure available knowledge, to make it as much accessible as possible to feed it into the discourse on media culture".

In much of the work of knowledge art, the contents communicated, are at least as important as the technology. Sometimes, the form and content consort together. One starts with the desire for a specific form, which bit by bit fills with content. The media art platform netzspannung.org has developed in a similar way. "Frameworks, in other words a criterion of regulations and rules, were made available, which then could be filled by the media art community with content and individual contributions. Netzspannung.org is at one and the same time a forum and an online archive". [33]

Communication and presentation formats such as "Energie-Passagen" or Medienfluss were developed with the notion of knowledge arts. With the image motif of the river, static and passive masses of information are transformed and flow out of the archive and around the visitor. In as much as the data appears animated as flowing movement, it is transformed into a time-based medium and can take up a narrative function. The Medienfluss interface, embodies the psychological meaning of the term "flow" [34]. By flow, we understand a sort of intellectual elation, which leads to thought flow, uncoupled from current reality. Flow can be described as a state in which attentiveness, motivation and the environment come together in a form of productive harmony. Flow means, to forget time. [35]

Knowledge maps such as the Semantic Map, or Matrix widen out information, side by side. Whilst the Semantic Map orders the spatial closeness of documents according to textual similarities, the Matrix incorporates the principle of serendipity. This term describes a co-incidental observation, something not originally sought out, which proves to be a new and surprising discovery, such as, for example when surfing the Internet, one co-incidentally discovers useful information.

The Virtual Book allows new work techniques such as collaborative writing and participative reading. Text in the Virtual Book becomes hypertext. The example of the Virtual Book highlights a spectrum of artistic and scientific research on the future of reading and the future of the book. Through the comments of the reader, furthermore, the complete reading process can be documented. Thus the text becomes a starting point for online discussions, or serves as first basis for collaborative writing techniques, such as the Surrealists in the 1920s described. In Cadavre Exquis, the Surrealists developed a continuous game with folded paper, in which many people, one after the other, could create a sentence or a drawing, without anyone knowing about the previous stage. André Breton argued, that in this way one could have access to an infallible means to turn off critical thinking and to create a free path for the metaphoric capabilities of the spirit. [36]

With the oncoming of the virtual book, the nature of the search has also changed. A search term is the semantic key for a search machine. Concepts and meaning evoked by the keyword and the semantic context of the book, determine the results of the search. The Virtual Book and its search profile, functions like glasses, through which the data domain can be contextually observed. Thus the 21st century book, presents itself as anticipatory. Its surface is virtual. It is a window to the temporal space of textual connections. [37] The idea of books as active

knowledge structures, is inspired by Marvin Minsky's provocative vision from the 1980s: "Can you imagine that they used to have libraries where the books didn't talk to each other?" [38]
Today information in the largest store of knowledge of human history, the Internet, is unstructured and passive. If we bow from Vannevar Bush on Marvin Minsky up to the Internet as a global brain, the projects presented here show first steps towards new seeing and cognition. It is possible that this new seeing will occure on the basis of language. Lingustic Turn reloaded.

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21 Vannevar Bush - As We May Think - The Atlantic Monthly, July 1945. Published in the Journal 'Form Diskurs', Nr. 2, I/1997, pp 136-147. <http://wwwcs.upb.de/~winkler/bush_d.html> Rev. 2008-09-27

22 Ibid.

23 Netzspannung.org is an input and output pool, a community publishing tool, an environment for sharing. It is a website for artists, scientists and scholars for sharing and developing their ideas on how to learn or how to teach new media (art). The online archive presents material such as research (projects), art, installations. It is an open channel for publishing projects by artists. <http://netzspannung.org> Rev. 2008-09-22.

24 Launch for Semantic Map requires Java Web Start <http://netzspannung.org/about/tools/semantic-map/?lang=en > Rev. 2008-09-22.

25 A self organizing map like the Kohonen Map <http://en.wikipedia.org/wiki/Self-organizing_map> Rev. 2008-09-26

26 <http://eculturefactory.de/digital-sparks-matrix> Rev. 2008-09-26

27 <http://www.eculturefactory.de/medienfluss> Rev. 2008-09-26

28 With PointScreen technology one accesses a novel navigational medium, which allows a contact free, gesture-based interaction. PointScreen was developed at the MARS - Exploratory Media Lab of the Fraunhofer IAIS. The PointScreen Technology is based on so-called "Electric Field Sensing" (EFS) and uses the human electrostatic field to control interactive applications. <http://netzspannung.org/database/pointscreen/en> Rev. 2008-09-26

29 Medienfluss Webinterface <http://medienfluss.netzspannung.org> Rev. 2008-09-26

30 The virtual book was first presented to the public at the Frankfurt Book Fair 2006 and the public reaction evaluated. <http://www.eculturefactory.de/virtual-book> Rev. 2008-09-26

31 Schaffner, Ingrid; Winzen, Matthias (ed) 1997 (german) 1998 (english). Deep Storage. Arsenale der Erinnerung / Deep Storage. Collecting, Storing and Archiving in Art, Prestel, München - New York

32 Oliver Grau (2004): »Immersion und Interaktion Vom Rundfresko zum interaktiven Bildraum«.

33 Söke Dinkla, Von der Medienkunst zur Wissenskunst. Einführung in die Ausstellung „Wissenskünste aus der eCulture Factory" <http://eculturefactory.de/download/dinkla.pdf> Rev. 2008-09-26 (Translated by the authors)

34 The term "flow" means the pleasure oriented feeling of a complete merging in an activity, a creative burst, or burst of activity. <http://de.wikipedia.org/wiki/Flow_%28Psychologie%29> Rev. 2008-09-26

35 In 1975, the psychologist Mihaly Csikszentmihalyi described the „flow-experience". He is though not the first to discover the concept, the writing of the educationalist Kurt Hahn (1908) with his extensive synonym on knowing "creative passion" and the doctor and educationalist Maria Montessori with "Polarisation der Aufmerksamkeit" (1909), describe the self-forgotten, playful, explorative activity of children as separation from the environment and the concentrated turning towards a certain immediate activity.

36 Definition by André Breton: Cadavre Exquis - Game with folded paper, which is about allowing a number of people to construct a sentence or a drawing, without a participant having knowledge of the previous contribution. The example, which has become a classic, which the game has given its name to, makes the first part of a sentence, created in this way: Le cadaver-exquis-boira-le-vin-nouveau. (fr="The delectable-corpse-drinks-the-new-wine").

37 See also Michael Wetzel: Flüssige Datenströme. <http://www.freitag.de/1999/52/99522701.htm> Rev. 2008-09-26

38 Kurzweil, R.: The Age of Intelligent Machines. Cambridge, Mass.: MIT Press, p. 328. (1990)