MAGICAL MIRRORS

D. Michelis[1,2] H.Send [2] F. Resatsch [2] T. Schildhauer[2]

[1]Institute for Media and Communications Management, University of St. Gallen, Switzerland
[2]Institute of Electronic Business, University of the Arts Berlin, Germany

Abstract

This article describes the multi-media art installation MAGICAL MIRRORS with which the tradition of the mirror, as a medium of visual simulation, is carried over into the world of digital mediums. As theoretical framework, the basic principle of remediation as described by Bolter and Grusin is utilized. According to this theory new media technologies always represent the advancements of prior media that are either enhanced in order to upgrade the features or replaced entirely. MAGICAL MIRRORS follows in the tradition of the magical mirror found in palaces or amusement parks. Like their predecessors they awaken the curiosity of the viewer and invite him or her on a trip into virtual worlds.

Categories and Subject Descriptors (according to ACM CCS): H.5.2 [User Interfaces]: Interaction styles

1. Introduction

Mirrors exert an almost magical fascination over the viewer. Ones own image and the world behind the mirror have for hundreds of years given rise to intense debate and wild speculations. Children, teenagers, and adults all observe their mirror image with great curiosity and experience themselves and their surroundings from new perspectives. This article describes the multi-media installation MAGICAL MIRRORS with which the tradition of the mirror, as a medium of visual simulation, is carried over into the world of digital mediums. As theoretical framework, the basic principle of remediation as described by Bolter and Grusin is utilized. According to this theory new media technologies always represent the advancements of prior media that are either enhanced in order to upgrade the features or replaced entirely. MAGICAL MIRRORS follows in the tradition of the magical mirror found in palaces or amusement parks. Like their predecessors they awaken the curiosity of the viewer and invite him or her on a trip into virtual worlds. With reference to the theory of remediation, the developmental histories of visual simulation until the 21st century are presented. The basic working principles for the viewer and user of the installation Magical Mirrors should be derived from these histories of visual production. In addition the theory by Bolter and Grusin is investigated to see what significance it has for the use and acceptance of the installation and whether the theory can be confirmed by MAGICAL MIRRORS.

2. Theoretical Framework

The theoretical foundation for the installation MAGICAL MIRRORS presents the concept of remediation by Jay David Bolter and Richard Grusin, who define remediation as the representation of a prior medium in a newer one. Remediation is for them, following Paul Levenson, the developmental logic of media, according to which traditional media are always advanced through new technologies. Paul Levenson defines remediation as an "anthropotropic process by which new media technologies improve upon or remedy prior technologies". In the theory by Bolter and Grusin, remediation is based on hypermediacy and immediacy, two oppositional developmental tendencies that are often encountered in tandem. Whereas for hypermediacy the viewer is explicitly reminded of the existence of the actual medium, the goal of immediacy is to make one forget this existence. On the one hand the viewer should be fully cognizant of the existence of the medium (hypermediacy), on the other hand he or she should have the impression of being directly immersed in the medially simulated content (immediacy). Hypermediacy is based on a fascination with the medium as representational technique, one that is consciously pointed out: "Hypermediacy makes us aware of the medium or media". This desire for hypermediacy is clearly shown in connection with "mediated spaces" such as amusement parks or street fairs: "In the highly mediated spaces of amusement parks and theme parks, the logic of hypermediacy predominates. The parks

themselves are full of sights and sounds from various media, and the attraction recall and refashion the experience of Vaudeville, live theater, film, television, and recorded music." In contrast, immediacy should shape the interaction with the computer as "naturally" and intuitively as possible, and create an "interfaceless" interface, through which the user can be integrated with objects as in the physical world. [1] As an overarching process remediation links the developmental tendencies of hypermediacy and immediacy with one another. In defining remediation, Bolter and Grusin reference McLuhan who already in the 60's in his book, "Understanding Media" postulated: "The content of any medium is always another medium. The content of writing is speech, just as the written word is the content of print, and print is the content of the telegraph". [McLuhan (1964), Pp. 23 - 24, quoted from: Bolter/Grusin (2000), P. 45] Bolter and Grusin take on this conceptual overview and supply additional examples for their theory: photography is for them the remediation of painting, film the remediation of theater. According to Schumacher [6] the word remediation can be traced back to the Latin "remedium" which is similar to the English word "remedy", an agent for something, denoted as a cure or aid. Schumacher's view incorporates this root and corroborates Bolter and Grusin's definition. For him remediation is a process of recasting and reshaping older mediums, through which the inadequacies of prior media forms are resolved and optimized media forms are developed.

3. MAGICAL MIRRORS

3.1. Visual Simulation in Digital Media

Long before the development of the computer the mirror was used as a medium for visual simulation and with them virtual worlds have already been simulated for hundreds of years. The term 'virtuality' originally indicated the opposite of reality: the virtual distinguishes itself from the real and denotes a fictional world. The mirror was the central instrument for the creation of a virtual world. The creation of illusion was and is its inherent function. The images that arise through the reflections on its surface exist only apparently. They reflect back another real image fictionally. [5] The ability to capture the real world and reflect it back in a true to life or even distorted way was for a long time the sole privilege of the mirror. Today this ability is emulated via digital media technologies. Through the development of photography, film, radio, television and computers today's world is inundated with images that imitate the virtuality of the mirror's image. [5] With the introduction of new mediums, not only the mirror but all forms of representation developed by man in the last five thousand years have been translated into digital form. As a consequence a variety of digital techniques for vision production have taken root that operate within the tradition of past mediums. They consistently fulfil the same goal: they satisfy the needs of the viewer and meet his or her desire for visual simulation. The content and purpose of the presentation haven't changed, rather the technique and form have. Through the use of digital technologies new opportunities arise to satisfy man's age-old desire for experiencing fictional worlds. Independent from content and fictional histories the desire for immersion is at the fore: in striving to experience fictional worlds we are searching for an experience similar to that of jumping into a swimming pool or into the ocean. The experience of being completely submerged in another reality. We enjoy leaving our familiar world behind and exploring the characteristics of the new environment. We want to swim around and see what new possibilities arise. The feeling of experiencing virtually a fictional place is according to Murray "pleasurable in itself". [3] The production of illusion in the 20th century was primarily overtaken by mass media photography, film and video, which were then displaced by the computer with its screen that Manovich also designates as "illusion generator" [4]. In the digital age analogue glass mirrors are displaced as a medium of visual simulation. In its place stands the digital screen as the dominant interface between man and computer.

3.2. Multi-media Installation

The idea of the installation is based on the attempt of establishing tried and proven interactions in public space into the world of digital media. As a result, the idea of the distorting mirrors, as used in many fairs during the turn of the century and later, was chosen as the tried interaction component. These distorting mirrors pleased many people because their functional principle can be discovered intuitively and playfully. Bearing the remediation principle in mind, the also called magical mirrors, were considered as potentially interesting interaction components for passers-by. The installation aims at encourage the debate on digital media and the research on technological possibilites and limits. The installation MAGICAL MIRRORS carries over the tradition of image production of the magical mirror into the world of digital media. The media facade on Rosenthaler Strasse in Berlin becomes a world of mirrors, through which the viewer can enter into a virtual reality. The installation is the third project played on the media-facade in Berlin-Mitte. The facade becomes a magical mirror, through which the observer can enter the virtual reality. MAGICAL MIRRORS adheres to the basic principle of Bolter and Grusin's elaborated theory of Remediation: As "magical" mirror, the installation follows in the tradition of the magical mirror found in palaces or amusement parks. Like its predecessors it awakens the curiosity of the viewer and invites him or her on a trip into virtual worlds.

The installation uses all possible projectrion spaces on the media facade. In the center of the installation are digital mirrors for an interaction with passers-by. The major elements of the installation are four life-size displays in the casino, three projectors in the foyer, as well as projectros in the so-called tower, foyer and casino.

Figure 1: *Media Facade Rosenthaler Straße.*

Live-size displays: Four life-size screens represent the heart of the installation, which is displayed on the whole building. The stronger the interaction of the passers-by, the more alive and warm gets the whole building.

Magical Mirrors invites passers-by to play before and with the following mirrors.

Luminary - The buildings is covered by a pulsating star from bright zeros and ones. Once the viewer steps before the mirror a current of zeros and ones develops around his body. The numbers react to his movements, so he can direct the cloud of number in the mirror.

Aura - The mirror is loaded with virtual energy. An aura of this energy develops around the viewer in front the mirror. It reacts to his movements with flame-like clouds that surround him like polar light.

Figure 2: *Mirrors Aura and Luminary.*

Flexibility - A magic ribbon moves over the mirror. The viewer can take it in his hands and write artful figures on the mirror and his mirror image.

Progression - Fast growing flowers follow the movement of the viewer and grow over the entire mirror. Once the viewer gets out of sight the plants shrink and disappear.

Projections in the foyer: The faces above the main entrance of the building act as a picture gallery of momentary photos taken in front of the mirrors. The aim of the picture gallery is the creation of an initial component to arrest attention of people from far away. The pictures shown build a colorful contrast against the color gradient in the building.

Figure 3: *Mirror Flexibility.*

Figure 4: *Foyer projections.*

Projector in tower, foyer and casino: Additional projector faces show a color gradient in and in front of the building. The color gradient depends on the interaction level of passers-by. Fragments of Lewis Carroll's book "Alice Through the Looking-glass" are projected on the facade and in the various projection faces [2]. The underlying text is not shown connected but in single words. The meaning of the text can be decoded by a close look into the subject as a whole. Furthermore background knowledge is needed on the text to recognize it.

3.3. Technical solution

The actual installation is based on an information technology infrastructure throughout the whole building. To display the three components (projections in the foyer, the projections in the tower and the displays) more than 13 different computers are used.

The fours mirrors - being the main interaction component - all face the Rosenthaler Strasse in Berlin, a street in the main tourist area around the "Hackesche Hoefe" in Berlin Mitte. Every mirror set consists of two single high resolution digital light processing (DLP) displays showing one picture in life-size. Between the DLP displays and the glass facade of the building a camera is installed in a wooden box, highly enough to reflect the person in front of the screen in an almost horizontal angle but not distracting the interaction (See figure 5)

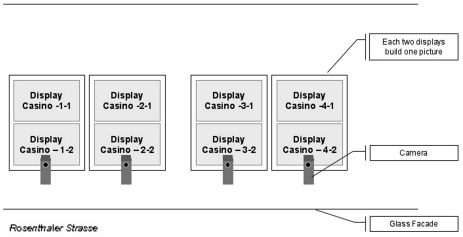

Figure 5: *DLPs at Rosenthaler Strasse.*

As the installation only runs during the night, four highly light-sensitive cameras were used. For the digitalization of the recorded video pictures, four frame-grabber cards were used in the server for the motion capture. The content for the display is shown by four single PCs. Figure 6 shows an overview of the technical infrastructure:

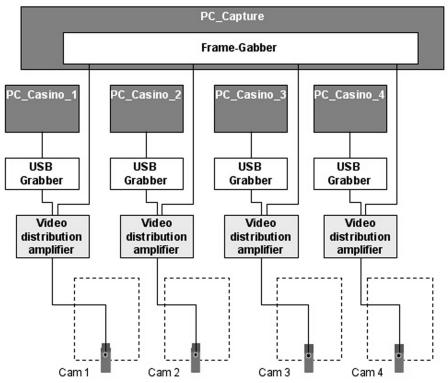

Figure 6: *Technical Overview.*

Based on the real-time picture of the cameras, the fastest-moving spot in the picture is being tracked and integrated in the interaction. The captured picture is then transformed with the respective illusion and displayed on the relevant screens. Based on a system by Ars Electronica Futurelab the software generating the visual illusions was programmed by DEON.

4. Conclusion

As the history of development of visual simulation shows, the basic functions of the installation are in the long standing tradition of distortion mirrors placed in the digital world. Using advanced camera and software technologies the functionality of the classic mirrors is remediated with more different functionality. The viewer does not only see his own reflection moreover he can enter a virtual world and directly interact with it. The installation MAGICAL MIRRORS combines the central development tendencies Hypermediacy and Immediacy that are underlying remediation theory. The media facade is a representative "Mediated Space" to attract passers-by and motivate them to interact with the mirrors. The interaction with the digital mirrors is designed as much as possible unstudied and natural, tied up to learned interactions. The interface itself Ð the front end of the screen Ð is not perceived by the viewers, the movements are intuitive and natural. Digital illusion generator can meet the demands of fascination, curiosity and manipulation more than static mirrors and cabinets could ever have. Only the possibilites of technology are something new, the desire of human mind to travel into fictitious worlds via visual illusions is the same. Using remediation theory, predictions of single media acceptance are possible - rather than predicting the overall development itself. Linking new media to learned tradition - like the play with the distortion mirror - helps users to copy these behaviours. MAGICAL MIRRORS showed that not only the interaction action itself can be transferred, furthermore the acceptance can be brought forward as well.

5. References

[1] Bolter, J. David, Grusion Richard (2000), Remediation: Understanding New Media, MIT Press, Cambridge, Mass.

[2] Carroll, Lewis (1872), Through the Looking-glass, "http://www.gutenberg.org/dirs/etext91/lglass19.txt" http://www.gutenberg.org/dirs/etext91/lglass19.txt

[3] Murray, Janet (1998), Hamlet on the Holodeck, MIT Press, Cambridge, Mass.

[4] Manovich, Lev (2001), The Language of New Media, MIT Press, Cambridge, Mass.

[5] Ryan, Marie-Laure (2001), Narrative as Virtual Reality: Immersion and Interactivity in Literature and Electronic Media, John Hopkins, Baltimore, London

[6] Schumacher, et al (2004) Einfuehrung in die Geschichte der Medien, Paderborn