Digital Media and Interactive Communication-expanded Space

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Abstract

Today's media can be defined as a media capable of two-way information exchange between a recipient and a sender, and the two-way information exchange means interaction between the sender and the recipient. This interaction of information exchange is applied as an important element to newly recognize the characteristics of new media. With the transition from analog to digital, digital technology has rapidly developed in the design field and is expressed in various genres. It communicates with humans through a complex method with images, videos, sound, and interfaces, and plays a big role in human experiences with sensation, perception, and cognition. As for the method of this study, it tries to examine digital media as a design extension through literature review and previous studies, and analyze the expressive characteristics of an interactive communication-extended space applying digital media in video and art media and an interactive space using digital media. In particular, it tries to suggest the applicability to space by analyzing the relationship between digital media and the user experience extension.

Keywords: *Digital media, Interactive, Communication, Expansion, Space*

1. Introduction

In general, when media is defined as 'outlets or tools used to deliver information', new media can be defined as 'newly developed tools used to deliver information'. Books that emerged in the text media era, and telegraphs, and telephones in the print media era can all be defined as media representing those eras. Also, in the development of radio wave media, it can be said that it is a new media that expands the concept of distance by freely sending voice signals that were transmitted over wires like telephones in the past through radio waves to remote locations [1][4]. However, the modern media is not simply a generic term for all the newly emerging tools used to deliver information but is positioned as a concept only for the newly recognized and mentioned parts in the current radio media era. From this point of view, today's media can be defined as a media capable of two-way information exchange between a recipient and a sender, and the two-way information exchange means interaction between the sender and the recipient. This interaction of information exchange is applied as an element to newly recognize the characteristics of new media.

Therefore, this study tries to analyze centered on interactive cases in the New Media Era in which media in various fields are constantly being generated and expanded and to study the characteristics of digital media and interactive communication-expanded space [2].

To this end, this study examines the characteristics of digital media and analyzes the case of interactive communication-expanded space that applies digital media as a design expansion,

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and digital media in video and art media. In addition, this study aims to analyze the expressive characteristics of interactive spaces using digital media.

1.2. Scope and method

The method of this study tries to examine digital media as a design extension through literature review and previous studies, and analyze the expressive characteristics of an interactive communication-extended space applying digital media in video and art media and an interactive space using digital media. In particular, it tries to suggest the applicability to space by analyzing the relationship between digital media and the user experience extension.

2. Digital media as a design expansion

Among the characteristics of new media examined above, interactivity is the most important characteristic that distinguishes it from other media. This characteristic implies several possibilities, one of which is the interaction between humans and things.

2.1. Expansion of media

In the eras before the information revolution, which began with the invention of photography in the 19th century, image processing was forced to rely on 'mimesis' like paintings and sculptures. However, for the last century and a half, when photography as a cloning device began to spread to everyday life, it has penetrated wide and deep into people's lives and dominated our vision. It further created a new media environment by combining analog sound technology such as record and tape, and image technology such as film, television, and video, leading to electronic media based on current digital.

2.2. Expansion of expression

Technology broadened the wavelength of expressiveness, and the screen transition effect, color manipulation, three-dimensional animation by computer, virtual reality, ubiquitous, invisible computer, touchable interface, and digital narrative began to combine. Through computers, the communication between humans and humans, humans and machines, and machines and machines continue to evolve in a previously unimaginable direction.

2.3. Expansion of interface

Not only the interactions between humans and computers, but also the relationship between humans and humans, and communication methods between various objects are newly emerging. For example, research on recognizing human emotions, analyzing their psychological state, and playing music appropriate to the situation, goes far beyond the boundaries of the uniform interface between humans and computers that we have thought of.

2.4. Expansion of area

The concept and purpose of art have changed from appreciation and collection to communication and sharing. And young artists who rebelled against the seriousness, uniqueness, and nobility of the so-called high art are expanding communication with the public while they cross computers and networks without hesitation, through the pursuit of fun, lightness, mass production, flexibility, and popularity through design and advertisement, web art, cartoon and animation, music video and video installation, etc. [6].

3. Interactive communication-expanded space with digital media

3.1. Interactive communication-expanded space appearing in art media

Rust Mirror (2010) by Daniel Rozin, made of 768 rusted steel tiles, uses a method that moves each tile by digitally recognizing the shape (shadow) of a viewer with a pre-installed camera. Dialtones (2001) by Golan Levin, as a telesymphony, is a concert performance through the interaction of light and sound with the audience. It is a 30-minute concert in which all the sounds are wholly produced through the choreographed ringing of the audience's cellphones. As the artist knows the audience's seating arrangement and can automatically change the ringtone, it is possible to create a wide variety of interesting patterns. Each of the audience is part of the audiovisual material and produces sound and light when the phone rings. This can be done, placed, adjusted, and deleted in the creative action of interaction with expression [Figure 1].

Figure 1. Daniel Rozin, rust mirror (2010)

3.2. Interactive communication-expanded space appearing in video media

Surrogates, released in 2009, is set shortly where people experience life vicariously from the comfort and safe home through surrogates, humanoid remote-controlled robots, invented by a scientist combining the dignity of man with the infinite power of machines [Figure 2] [9]. The Matrix, released in 1999, depicts a future where humanity is trapped inside a simulated reality by being brain functions controlled in the Matrix, created by a computer, the product of the best technology of modern science. It is the most advanced form of skepticism of cognition as it is skeptical of the reason of mankind itself. Philosophy and the technoscience of computers are exquisitely meeting in the film, but humans realize the fiction of this exquisite program and realize their reality [9]. Avatar, released in 2009, depicts a genetically engineered new hybrid creature between humans and a local tribe of Na'vi to Pandora. The avatar body can be operated from the brain of a remotely located human through a link machine. Pandora is a new planet discovered by mankind and a space full of vitality. There, trees reaching 300m in length form the rainforest, and huge mountains are constantly moving while floating in the air due to the magnetic field of a material called unobtainium [Figure 4] [9].

Figure 2. Surrogates (2009)

Figure 3. The Matrix (1999)

Figure 4. Avatar (2009)

As described above, the application cases of digital media in video media set the whole world as virtual reality through the technological development of new media. In these films, humans perceive objects and replace them with electrical signals transmitted to the brain, and they create a surplus self-image to live through neural interactions, which indicates the technological development of new media.

4. Digital media in an interactive space

Modern space is reacting and transforming in connection with the new dimension of time. It is a new dimensional network that encompasses the interaction between 'subject and space' as a dynamic substance containing information and a catalyst for its external change, and 'space and space' following the emergence of intelligent objects, which can be said to be the characteristic of digital media space in the information age [4]. When looking at the properties of real physical space in architecture, three-dimensional space is formed according to a structural method with the most basic elements such as ground, walls, and ceiling. Also, while different forms and functions have been created in the real relationship between things, people, and the environment, the digital space provided by the media shows a more active interactive relationship between a user and space. It attempts to examine the concept of extension by the digital spatial structure according to the classification of J. Marray (1997).

Table 1. The concept of extension by the digital spatial structure according to Marray's classification

Classification	Descriptions	Concepts
Digital spatial structure	Easy accessibility between digital space and users	Accessibility
	Realization of emotional perception by new technologies of videos, texts, and sound	Sensibility
	Digital media provides a virtual space to move around in time and space.	Spatiotemporally
	Information storage and delivery space, efficient visual information delivery	Information delivery
	Interactive communication, operation, and reaction, Overcoming Spatio-temporal constraints	Interactivity
	Complex experiences through fusion, transformation, and processing, Five senses experiences	Complexity

4.1. Expression elements and expressive characteristics of interactive space using digital media

Images, sound, and movements appearing in the digital spatial structure are the elements that have the greatest influence on visual perception and deliver intuitive meaning. In particular, sounds are classified into music, sound effects, and voice, creating an atmosphere with images and movements provided in the digital space and bringing synesthesia to the stimulated emotions. The interactivity and the complexity of the five senses experiences facilitate accessibility that users can control themselves, and distinctively enhance expressions in information delivery [3].

Table 2. Expression elements of space applying digital media

Movement (Physical)	Daniel Rozin Rust Mirror (2010)	Direct participation, Perception, and sensation by physical movements	
		Image
		Descriptions	It consists of 768 oxidized steel tiles, moving each tile by digitally recognizing the shape (shadow) of a viewer with a pre-installed camera.
Sound (Sound effects)	Golan Levin, Dial tones (2001)	Creating an atmosphere with artificial sound effects, Synesthesia	
		Image
		Descriptions	As a tele symphony, it is a concert performance whose sounds are produced through the interaction of light, sounds, and audiences. In the 30-minute concert, sounds are played through the carefully choreographed ringing of the audience's mobile phones. Because the exact location and tone of each participant's mobile phone are known in advance, it can present a diverse range of unprecedented sonic phenomena and musically interesting structures. Each of the audience is part of the audiovisual material and produces sound and light when the phone rings. This can be done, placed, adjusted, and deleted in the creative action of expression and interaction.
Image (Realistic)	Egg of Winds (Town Gate for Okawabata River City 21)	The shape, color, and light of the image convey intuitive meanings.	
		Image
		Descriptions	It not only digitizes various types of external environment information but also secures internal and external synchronicity by making the information floating on the inner and outer boundaries.

4.2. Case analysis result

The development of media is proceeding with different approaches in many areas. As such, spaces are becoming more and more diversified with the development of media, and the interactivity of digital media provides various experiences and information through interaction with users in space. Through this study, the process of making it a place for communication with a lively and sensuous space was examined through cases by moving away from the concept of absolute space and combining a new phenomenon called digital media. In the end, it can be classified into three categories as expressive characteristics for the creation of digital media and interactive communication space.

First, the interaction between humans and computers through the interface of digital media changed the wall of the building from the purpose of protecting humans from the external environment to a screen containing dynamic information. In this way, interactivity has gone beyond a dimension to the concept of a dynamic space that interacts with humans and physical environments, buildings and external environments, as well as humans and external environments.

Second, digital media has come as a variable space concept contrary to fixedness and immobility. In other words, it showed a change expressing this as a hypothetical temporality while it stood for 'non-fixed', 'movable at any time', and 'valuelessness for eternity'.

Third, today's human life has come to share information and communicate with each other beyond the distance between the existing space and time through an abstract virtual space rather than a substance. In particular, the discussion on cyberspace distracts the customary boundaries between inside and outside, private and public, and reality and virtual, and the need to establish a new relationship between them is higher by drawing the expanded concept of space beyond the concept of the physical environment into urban space. After all, the society of digital media provides a variety of spatial order as all places can be the center in digital media. Media with such various expressive characteristics will widen the possibility of space development through design expansion, and broaden the perspective on new social values that are constantly generated in the present and the future along with the increasingly diverse user needs as well as the interface of the space.

5. Conclusions

Japanese architect Toyo Ito mentioned that dynamic architecture is the architecture reflecting the changing times, while he suggested the interaction and change of space as a strategy for realizing architecture. In the end, what he meant is understood first to make it seemingly unsubstantial even though there is substance, and second, to create a constantly changing architecture, that is, a dynamic architecture [6]. In other words, Toyo Ito envisions a blurring architecture between those structures as an alternative architecture, hoping that the dual contradictory structures found in modern society, cities, and architecture appearing in the new media era will be vaguely merged. He said, "It is an architecture of flexible images that cannot be defined in a clear form [5]." Also, William J. Mitchell mentioned an interface as a feature of digital mechanisms in his book titled *City of Bits*, saying "An interface is a mechanism that mediates between the external environment of an analog system and the internal environment of a digital system through technology, which transcends the traditional facade concept." Such an interface can be a boundary having both continuity and discontinuity described above. The electronic environment created by modern digital information technology allows us to reconsider existing ideas about the inside and outside as well as the physical environment. The

importance of the role of dynamic and correlated interfaces is emerging rather than a concept of a static and hierarchical façade [8].

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