The Characteristics of Affective Turn in Media Arts through Relational Aesthetics
-Centered on the Digital Works of TeamLab-

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관계미학을 통한 미디어아트의 정동적 전회의 특성
-TeamLab의 디지털 작품을 중심으로-

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Abstract This study will attempt to analyze media art and discuss its main characteristics by using the concept based on Relational Aesthetics 'Affective Turn' as a basis of the theory. In addition, this study has some theoretical and practical implications, both in terms of the research and analysis of artworks and the structure development of art theories and aesthetics. To conduct the research, I have gone through a literature review on previous studies related to media art and Relational Aesthetics. Then, I have conducted a case study on the media art of TeamLab. This study shows that from the perspective of Relational Aesthetics, media art shows unique characteristics such as borderless and shareability. Moreover, it can allow the audience to actually 'feel' the relationship and integration between various objects. I hope that this research could be used as a solid basis for future research and help strengthen the interaction between modern art and the public.

Key Words : Relational Aesthetics, Affective Turn, Teamlab, Borderless, Shareability, Media art

要 약 본 연구는 관계미학의 '정동적 전회(Affective Turn)'을 이론의 근거로 삼아 미디어아트 작품을 분석하고, 그 특성을 논의하고자 한다. 디지털 예술 작품에 대한 새로운 접근과 분석 방법을 시도함으로써 미디어 예술 작품의 특성을 도출하였는데에 실천적 의의가 있다. 이를 위한 본 연구의 전개는 미디어아트와 관계미학에 대해 문헌을 중심으로 고찰하고, 이를 기초하여 Teamlab의 미디어아트를 대상으로 사례연구를 진행한다. 본 연구는 가장 현실과 중앙 현실을 이용한 미디어아트에 대한 관계 미학의 관점에서 분석한 결과 실제를 넘어선 보더리스(Borderless), 공유성의 특성을 보이고 있다. 이를 바탕으로 사람과 자연, 사람과 사회, 사람이 환경과의 관계를 연결하고, 관람객으로 하여금 사물과의 관계와 통합을 느끼게 한다. 새로운 미디어 예술에 관한 본 연구는 관련연구의 기초자료로써 활용될 가능 기대하며, 또한, 현대예술과 대중 간의 상호작용을 강화하는데 일조하기를 기대한다.

주제어 : 관계미학, 정동적 전회(Affective Turn), Teamlab, 보더리스(Borderless), 공유성, 미디어아트

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1. Introduction

1.1 Research Background and Purpose

Early media art was mostly centered on the artist's intentions of experimenting, creativity, and rebellion. In other words, expressing the artist's personal ideologies and ideas was considered far more important than the audience's expression of opinion. Contemporary media art, however, focuses on characteristics such as interactivity, virtuality, and multi-dimensionality, and puts an emphasis on 'sharing' such ideas with the audience. We can say that contemporary media art is centered around creating an 'Affective Turn' in the artists and the audience. Empathy widens the boundaries between the artist and the audience, the limitations of daily life between art and the audience, and the boundaries of time and space.

The more obscure it is, the more it forms the 'borderless' characteristic of contemporary media art. 'Infinity Mirrored Room,' a work created by the Japanese Artist Yayoi Kusama, creates a visually endless space by using mirrors. By combining hundreds of LED light bulbs, the audience can easily experience a new sense of artistic charm in a multi-dimensional space by connecting entertainment value with the audience interactive. In the case of Random International's 'Rainroom,' it artificially simulated the environment of a rainy day by using advanced science technology. When a person enters the 'Rainroom,' they can walk across the room without getting wet thanks to the motion capture equipment and backstage real-time computation calculation technology. Some can even say that the work of 'TeamLab' satisfied the common wishes and emotional needs of the artists and the audience. Such 'Affective Turn' has been the driving force behind the development of art.

To follow the recent trend of research on Relational Aesthetics and media art, several studies have been conducted by many researchers (i.e., Oh Tae-won 'The Interaction in Contemporary Art as seen from the Relational Art of Nicolas Bourriaud – With a Focus on Cases of Inter-media Art (2018),' Cho Sarah 'A Study on the Criticism of International Art Exhibitions since the 1990s from the Perspective of Nicolas Bourriaud's Relational Aesthetics (2017),' Baik Young-ju 'Collaborative Dispositions of Participatory Arts in Contemporary Practices – Based on Nicolas Bourriaud's Notion of Post–Production (2018)'.

However, few studies started from an aesthetic point of view and studied media art using theories related to Relational Aesthetics. Thus, this study will attempt to analyze media art and discuss its main characteristics by using the concept 'Affective Turn' as a basis of the theory. In addition, this study has some theoretical and practical implications, both in terms of the research and analysis of artworks and the structure development of art theories and aesthetics.

1.2 Research Methods and Scope

To conduct the research, I have gone through a literature review on previous studies related to media art and Relational Aesthetics. Then, I have conducted a case study on the media art of TeamLab. TeamLab combines various elements such as art, science technology, aesthetics, etc. to create unique and somewhat ambiguous works that blur the boundaries between technology and art, ultimately presenting a 'borderless' perspective and shifting the direction of emotions for the relationship between the audience, work, situation, etc. The research was conducted according to the following process. First, through an in-depth literature review, I have looked deeper into the characteristics of Relational Aesthetics, the conversion of emotions, media art, and the relationship between each other. Second, by analyzing the
creative ideology of TeamLab, I was able to derive a conclusion that when the audience appreciates a specific piece of artwork, they 'sympathize' with the work through a surreal 'emotional conversion' that transcends space and aesthetic processes. I hope that this paper can help media artists develop a new way of expressing themselves, and I also wish that this research can serve as a basis for further research in Relational Aesthetics.

2. Theoretical Consideration on Relational Aesthetics

2.1 Characteristics of Relational Aesthetics

In 'What is Relationship,' Nicolas Bourriaud accepts the philosophical ideas theories of Félix Guattari, Gilles Deleuze, and Baruch Spinoza to seek the philosophical roots of 'relationship' and establish the existential framework of Relational Aesthetics.[5] Later on, Bourriaud argued that Relational Aesthetics is not a 'rigorous art theory,' but a 'form'.[5] He borrowed Louis Althusser's 'Aleatory Materialism (Materialism of the Encounter)' to establish the concept of 'Relational Aesthetics' by starting from the meaning of existence 'form'. Next, he also stated that because of 'aleatory' and 'uncertainty', all objects appear to be in a 'continuously aleatory' state.

The term 'relationship' has two basic characteristics as a philosophical proposition, which is the 'devenir/becoming' and 'plurality' of relationship.[13] Thus, in order to have a better understanding of the term 'relationship' used in Relational Aesthetics, one must go through a logical consideration of 'devenir' and 'plurality' in the context of ontology. (Table 1)

1) 'Devenir' of Relational Aesthetics

First of all, 'relationship' can be understood as the 'relationship of generativity,' and such 'gene

<table>
<thead>
<tr>
<th>Aesthetic Paradigm</th>
<th>Plurality</th>
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<tbody>
<tr>
<td>Devenir</td>
<td>Existence (Expressive State)</td>
</tr>
<tr>
<td>Subjectivity</td>
<td>Expression of Relationship with Others (Meaning)</td>
</tr>
<tr>
<td>Alterity</td>
<td></td>
</tr>
<tr>
<td>Creativity</td>
<td></td>
</tr>
</tbody>
</table>

reliativity' mainly stems from the 'alterity of subjectivity' and 'creativity' of a relationship. Therefore, when discussing the 'generativity' of a relationship, it is inevitable to return to the question about subjectivity. 'Subjectivity' is an important theme that has always been at the center of discussion in Western philosophy ever since Rene Descartes popularized the term, and is considered a key category in the 'Branch of Epistemology' of Western philosophy. In Relational Aesthetics, Felix Guattari, one of the most well-known psychoanalysts in the world, goes beyond Descartes' 'Subjectivity' by coining the term 'The End of Subjectivity,' seeking philosophical ideas regarding the 'new changes in our subjectivity, potential, and practicality,' and 'subjectivity' itself.[6]

Guattari's new idea on 'Subjectivity' is about putting ourselves in the relationship of alterity and creating the 'subjectivity' of duplicability, processability, heterogeneity, and creativity. Based on this approach, Guattari presented the theory 'Production of Subjectivity.' The 'Production of Subjectivity' belongs to Guattari's 'Aesthetic Paradigm' theory, and is an aesthetic paradigm centered around 'affect'.[7] It aims to escape the fixed structure and hierarchical order of the paradigm by emphasizing the diversity and heterogeneity of affect and perceived objects. He described the process of territorialization, de-territorialization, re-territorialization as 'chaosmosis'. Chaosmosis is not the wave between zero and infinity, existence and futility, or law and chaos, but is the process of
de-territorialization of objects, through which the potential of the subject can be released.[14] In the end, 'Chaosmosis' has become Guattari's 'existential state,' and not only does it highlight the characteristics of a subject to self-create, but it also emphasizes the characteristics of assemblage and creativity during the course of an aesthetic paradigm.

In <Relational Aesthetics>, Nicolas Bourriaud made the following comment on Guattari. 'To Guattari, 'art' is something that can be newly organized with 'subjectivity' on top or surrounding it'[5] Bourriaud saw that the basis of practicing art lies in the production of subjectivity, which is a view that regards the subject as a product of processability, alterity, and creativity, which in fact reveals the 'devenir' of relationship, a primary characteristic of 'relationship' in Relation Aesthetics.

2) Plurality of Relationship

Relationship is the 'relationship of plurality,' and plurality is the condition that generates the essential condition of 'relationship'. Relationship does not exist in the form of a single object. Instead, they rather occur from the process of two or more elements meeting and cooperating. Such plurality shows the basic state of a 'being'. Gilles Deleuze argued that any being with a specific form depends mostly or partially on a single determinant, which reveals its relationship with other people. Since a single creative, imperishable desire has no external object, there will never be an attempt where it tries to occupy, deny, or objectify others. Conversely, it will try to find the 'couple' of others and combine with itself to become a single plural.[12]

In <Relational Aesthetics>, Nicolas Bourriaud did not directly refer to Baruch de Spinoza. Still, the clue can be found in Louis Pierre Althusser's 'aleatory materialism', which he did cite in his publication. Althusser argued that 'The essence of a person is to go beyond individuality'.[5] The essence of a human being is to think about existence by placing an individual within the plurality of a single subjective relationship. The existence of plurality is determined by its inherent, sacred essence.

The logic inherent in the two characteristics mentioned above is that a 'relationship' can be understood as a 'plural relationship'. Next, the plurality of a relationship is the premise of generating a subject, and if we fail to recognize that we co-exist with others in the form of a plural, we cannot recognize the 'creativity of a subject,' in other words, the fact that a subject can continuously generate new subjects during the process of constantly facing others. Media Art Relationship Aesthetics Literature Table 2.

Table 2. Media Art Relationship Aesthetics Literature

<table>
<thead>
<tr>
<th>Name</th>
<th>Literary work</th>
<th>View</th>
</tr>
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<tbody>
<tr>
<td>Nicolas Bourriaud</td>
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<td>· Bourriaud argued that Relational Aesthetics is not a 'rigorous art theory,' but a 'form.'</td>
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<tr>
<td>Félix Guattari</td>
<td>Capitalisme et schizophrénie II: Mille Plateaux 2013</td>
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<td>Gilles Deleuze</td>
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2.2 'Affective Turn' in Relational Aesthetics

The 'Affect Theory' has been prevalent in Western humanities, and in the 'Criticism Theory', the current trend is to shift the paradigm of the 'Affective Turn'. This new paradigm takes 'emotion' as the focal point of the theory and focuses on the complex descriptions of emotion, transcending the previous research paradigm, which was based on rhetorics and semiotics. The concept of 'affect' was first coined by Baruch de Spinoza, and developed into an important theory on the production of subjectivity through the theories of Gilles Deleuze. The concept 'affect' is already widely popularized in each field of humanities, and is deeply involved in the expression of meaning, especially in the field of culture and politics.

From the point of view of 'affect,' today's artistic creation can be seen as a collection of 'affect'. And as Deleuze said, today's artistic creation can be considered a monument that points toward the signifiers of language, which consists of a collection of percept, affect and sensation, instead of the three traditional elements: perception, affection, opinion.[9] In other words, art is actually the 'placement of senses,' and as Jacques Ranciere once said, the 'division of emotions'.[19] This means that aesthetics is no longer about reflecting our daily lives or looking back on our life while standing on the other side of life, and the essence of it is the division of emotions, a key that allows us to encounter life. In Relation Aesthetics, the existential implication of a 'relationship' represents the aesthetics centered around some kind of an 'affect'. Relational art focuses on the form of creating relationships and restores the layout structure of the experience that we feel. Of course, the process of arranging the emotional experiences are based on creativity. This is because the primary purpose of art is to create new emotions within a given sensory structure. As Alain Badiou once said, art is about creating a 'new emotional relationship'.[4]

2.3 Sub-Conclusion

Nicolas Bourriaud's <Relational Aesthetics> deeply contemplated the practice of relational art based on the 'relationship' that took place in the 1990s. Starting from key problems that occurred due to the emergence of capitalism, he discussed the ethical needs of relational arts and also analyzed the form of relationship from an existential perspective to establish the basis of 'relationship' in relational arts, in other words, the generativity and plurality of relationship. The two main characteristics of relationship were facilitated by Deleuze's 'Creative Power of Desire'. This creative power of desire is the mechanism of 'affect,' making the practice of relational art into a collection of 'affect,' fundamentally proceeding with the arrangement of emotional experiences. In fact, Relational Aesthetics implies the meaning of 'affect'. It sees art as a 'combination of affect and perception,' and aesthetics as a layout of emotional experience.

Relational Aesthetics not only helps the public understand relational art, but it also provides a theoretical foundation for the 'Affective Turn' of media art. (Table 3)

Table 3. 'Affective Turn' in Relational Aesthetics

| René Descartes | "Subjectivity" is an important theme that has always been at the center of discussion in Western philosophy ever since Rene Descartes popularized the term, and is considered a key category in the 'Branch of Epistemology' of Western philosophy. |

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<tbody>
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<td>Creation &amp; Existence</td>
</tr>
<tr>
<td>Affect</td>
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<tr>
<td>Artwork</td>
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<tr>
<td>Human</td>
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This publication is designed to be clearly visible and legible.
3. Relational Aesthetics & Media Art

3.1 Characteristics of Media Art

Art has advanced to this day and has already entered a whole new stage, and the boundaries of different art genres have become more blurred than ever. Along with the rapid development of science and technology, countless new types of art media have emerged to the surface, and the intervention of new material and new perspectives have accelerated the development of media art. Media art, especially digital media art, has already become one of the most prominent art trends around the world in various fields. Media art is adding more fun to the lives of the public by utilizing the most simple yet concise expression symbols of humanity, while presenting unique artistic effects through state-of-the-art technology and the most effective transmission methods.

The value of media art stems from the necessity and meaning of the existence of media art. To put it in the most superficial sense of value, media art always has an emotional quality combined with one's subjective appreciation. On an empirical level, the emotional dimension of media art is regarded as beyond the mere personal level, sublimating it to something common to humanity, leading to immersion and continuing. In addition, media art is always directed toward the spiritual state of the art subject, and it is maintaining the dignity of openness and improvement, forming the most basic values and meanings of media art in that it constantly sublimates human artistic activities. Media art helps to reinforce emotional and formal interesting things, and also helps to reinforce the activeness of such properties and forms. Of course, media art brings social values into experience through its most complete, well-rounded, and impressive aesthetic methods by integrating other factors, such as education, practice, and society, in addition to factors such as aesthetic feelings, aesthetic attitudes, and aesthetic imagination. The value of media art lies in the ideals presented in it rather than the experience itself, and encourages us to devote ourselves to new fields. Media art contains not only primordial life but also emotional pleasure and essence of human survival essential for life beyond that. It is valuable in that it gives profound meaning to media art and spiritual power to encourage mankind to move forward, looking at the past and the present, and moving forward toward the future. For example, among TeamLab's works, a video portraying inner enlightenment and contemplation from insight and enlightenment of the real world, puts an interest in the value of one's life by bringing aesthetic images, aesthetic knowledge, and aesthetic concepts into everyday life as the author delivers them to the audience according to the passage of time in the video, starting with aesthetic achievements in the process of the creation of the work. Media and science and technology continue to enrich the means of reproduction and expression of media art, and the 'beauty' of media art gives various meanings according to the changes of social culture. Meanwhile, the audience's "viewing" behavior is constantly changing in terms of aesthetic habits and aesthetic psychology. This is exactly the artistic value of TeamLab's works.

The form of expression in media art shows completely new features that distinguish itself from traditional media. Such features are also closely linked to modern science, allowing the audience to have new experiences as they appreciate new media art. In sum, media art as a whole shows a 'borderless' characteristic, and can be represented by the following three sub-characteristics: interactivity, virtuality, and multi-dimensionality.

First, interactivity. The interactions in media art are definitely different from that which can be seen in traditional art, and the most
prominent feature in media art is 'interactivity'. Interactivity is not only a technical problem, but also a problem of artistic conception and the style of expression, and is a common aesthetic feature of modern art.

Second, virtuality. The essence of virtual reality is, after all, art, not technology, and it might perhaps be the highest level of art.[11] The virtual aesthetic landscape is supported by technology, among which art also appears. Unlike the form of art shown in media, media art gains the beauty of 'surrealism' by highlighting the importance of interactivity with art, combining different forms of media, and cleverly fusing the roles characteristics of different media to simulate a situation that could not be seen or reproduced in reality, allowing the audience to immerse into a virtual space.

Third, multi-dimensionality. After the emergence of media art, new art styles, creative techniques, theme types, and ideologies have appeared, further separating it from traditional art. While conventional art usually stimulates a single sensory system within the human body, multimedia art stimulates multiple senses at once to enrich the audience’s experience. By utilizing various modern technologies such as multimedia systems, telecommunication technology, remote sensing, etc., media art creates a multi-dimensional space that can maximize immersion, and gives the audience an opportunity to have a unique aesthetic experience through the stimulation of various senses.

3.2 'Affective Turn' in Relational Aesthetics & Media Art

The 'Affect Theory' in Relational Aesthetics emphasizes the importance of emotions produced by the active and passive contact between our bodies. A study even found that the creation & change of 'affect' can be promoted through the method of overlapping and transition and by marking the motive of other emotional states. That is why the 'Affect Theory' can help us understand the somewhat complex and delicate relationship between our body and the world, and observe the 'turn' of joy, pain, and desire in the 'affect' of media art.

This paper starts from the perspective of the viewer, analyzes the 'Affective Turn' of media art in the current digital environment, and discusses the three aspects: 'Affective Turn' of aesthetic characteristics, 'Affective Turn' of space, and the 'Affective Turn' of aesthetic psychology.

First, 'Affective Turn' of aesthetic characteristics: Authenticity.

Media art has evolved with technology, and visual perception is an important element of media art. There is an ever-changing, delicate relationship between media art and the world of truth. The creation of media art goes beyond the truth and communicates more deeply with the mass public. The ideology behind the creation of media art also emphasizes the expression experience in a visual form, interpretation of culture and ideas, and the satisfaction of sensory desires.

Second, 'Affective Turn' of aesthetic space: Borderlessness.

In the aesthetic realm of media art, 'space' is the medium that reconstructs and constructs a certain aesthetic relationship. From the traditional media age to the digital media age, the aesthetic space of media was converted from a public space to a private space, fixed space to mobile space, and physical space to a virtual space. The 'Affective Turn' of space is the material and logical premise of media art's aesthetic activities. Benjamin Barber saw the digital information age as an era in which the 'participatory culture' could be realized without any major obstacles and saw participation, propagation, and extension as a new environment for the space of media art.

Third, 'Affective Turn' of aesthetic psychology: Shareability
The aesthetic activities of media art pushed the originally inherent, secret, closed aesthetic behaviors into an open and shared medium environment. 'Sharing is a particular kind of sacrifice, which can bring great recognition from the people.'[16] People who share the same aesthetic taste form a community with the public and constantly extend their social reach. His personal attributes, cultural backgrounds, historical memories, and self-expectations become more and more identical with others by sharing aesthetic acts.

3.3 Sub-Conclusion

Based on the human subconsciousness and psychological association, media art inspires our emotions and individuality through an 'artistic form,' creating a relationship of 'Borderless Empathy'. This model consists of an artist, media art, and the audience, and the emotional conversion of media art is achieved through two stages. (Table 4) The first stage is the basic step for emotion. In this stage, the artist completes the work through the combination of situational design and aesthetic design. Situational design includes various elements such as the subject, character, plot, sound, etc. of the creation, and aesthetic design is mainly composed of elements such as the material, shape, media, etc. of the creation. The second stage is the in-depth stage for emotion. It is completed based on the media art itself and human senses. At this stage, various media technologies such as augmented reality, gesture recognition, Kinect sensor, etc. are used to analyze the audiences' emotional needs, media format, and feedback from the audience. Furthermore, the audience uses their sensory organs to connect themselves with the artist. In the relationship between the artist, media art, and the audience, artists and visitors form a basic relationship through the aesthetics of relationship, and the audience goes on to form an even deeper connection with the piece of work through the conversion of emotion. This is the main content and the focal point of this paper. By discussing and organizing the development & characteristics of Relational Aesthetic and media art, this paper configured the aesthetic paradigm of the 'Affective Turn' in media art, and divided 'affect' into two different stages: basic stage, in-depth stage. Among them, the basic stage of 'affect' includes landscape design and aesthetic design, while the in-depth stage of 'affect' includes interaction design and the process of public interaction.

Table 4. The affective turn of media art

4. Case Study

4.1 Subject & Method of Case Analysis

Established in 2001, 'TeamLab' is an art group that combines various fields of art. The group was founded by Toshiyuki Inoko and his university friends. They are currently focusing on using digital technology to diversify their forms of artistic expression. TeamLab consists of experts from various fields, including artists, programmers, engineers, CG animators, architects, mathematicians, and graphic designers. Their main goal is to break down the concept of 'boundaries' through environmental
experience and multi-dimensional interactive models, allowing the audience to dive into the world of 'borderless art,' which encompasses science & art, virtual & reality, human & nature, human & society, and ultimately, human and the world. TeamLab's works, which utilizes science technology to tear down the boundaries between physics and concepts while presenting new 'sensing models,' deals with various themes that we often face in our daily lives. If you classify TeamLab's work based on different 'concepts,' they can be roughly classified into 9 concepts, and if you attempt to classify them based on different 'series,' it can be divided into 14 series. In addition, some of TeamLab's work is created through the fusion of different themes and series. In this paper, the research was conducted based on three 'concepts' according to the 'scale (size),' 'number of times it has been exhibited,' and 'influence'.

Table 5. Approach for Case Analysis

<table>
<thead>
<tr>
<th>Affective Turn of Relational Aesthetics</th>
<th>Characteristics of Media Art</th>
<th>Characteristic of Relational Aesthetics</th>
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</thead>
<tbody>
<tr>
<td>-Creation &amp; Existence</td>
<td>-Interactivity</td>
<td>-Generativity</td>
</tr>
<tr>
<td>-Affective Turn between Human and Artwork</td>
<td>-Virtuality</td>
<td>-Plurality</td>
</tr>
<tr>
<td></td>
<td>-Multi-Dimensionality</td>
<td></td>
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</tbody>
</table>

The main theme of this series is about <Removing the Boundaries Between Artworks> (Fig. 1). 'Boundaries' are formed with the purpose of people expressing their ideas and thoughts in the real world. However, in a digital environment, since art can freely cross such boundaries, art breaks free from the constraints of the traditional frame through media technology. Through landscape design and aesthetic design, the artist dismantles the boundaries, causing new changes by allowing the work to influence and be influenced by other works, the audience, space, etc.

Fig. 1. Removing the Boundaries Between Artworks

<University of Water Particles, Transcending Boundaries> (Fig.2) also constantly challenges the human vision and hearing based on powerful
scientific technologies. As simulation technologies develop even further, it becomes even harder to distinguish reality from virtual reality, and the boundaries between subjects and objects also become ambiguous. If this trend continues and reaches a certain threshold where it becomes nearly impossible to distinguish reality from virtual reality, we may end up thinking that every entity is a fantasy, and every fantasy can feel like reality. Perhaps, what media art should pursue in the future may be to achieve the goal of 'seeing beyond sight'. Going 'beyond reality' shows the truth that is pursued by media art, suggesting that, in the end, we should return to the 'dimension of mind' instead of being immersed in the 'dimension of senses'.

Fig. 2. Universe of Water Particles, Transcending Boundaries

Fig. 3. Forest of Resonating lamps – One Stroke

In the case of <Forest of Resonating Lamps – One Stroke> (Fig.3), The audience will be immersed into the dynamically changing virtual space as they move around, recognizing the presence of others who exist in the same space. During this experience, an emotional change will occur in the audience's mind, and such emotional shifts will help them go beyond their perception of art in the real world and the virtual time & space within their existing memory, ultimately allowing them to fulfill their sensual desires. As shown in this work, techniques that use light as a medium aim to reveal the physical and ideological limitations of the traditional relationship between the artwork and audience. Based on this, it induces the interaction and convergence between works and dismantles the barrier between the work and the audience.

< Graffiti Nature > (Fig.4) depicts the landscape of a canyon. In < Graffiti Nature >, the artist uses digital art to create a natural world full of various creatures and flowers, then invites the audience to the wonderful virtual world. From the audience's perspective, other audience members become a part of the environment in which they are immersed to, thereby creating a completely unique new media art space environment.

Fig. 4. Graffiti Nature

Realism is one of the most definitive and important factors that enable art to cause waves in our emotions. Nowadays, computer technology provides artists with an even stronger creative media, generates more realistic visual images, and further blurs the boundaries between truth and fiction through interaction with the audience. When we look again at the 'realism' of art through today's digital art, we may be overwhelmed by the emotions caused by profound pieces of art, which transcends the realm of simple senses. Digital art is touching, not just because of the realistic illusions it creates, but because there is something 'wonderful' in that fantasy, allowing people to connect with their personal or collective experiences.
4.2.2 Border lessness

Traditionally, the formative expression of art and design is largely dependent on sense and knowledge regarding the temporal & spatial nature. However, thanks to the development of science and technology, human vision is no longer limited to 2D and 3D space, which led to the emergence of time 4D. Such change led to the internal external innovation of art creation. In general, space is usually divided into two different types: 'Natural Space' and 'Space that can be Perceived by Human'. However, this kind of classification is a rough cognitive classification based on our perception of 'space,' and is not a strictly scientific, philosophical classification. What is 'real' space?' is a question that cannot be solved with today's science and wisdom, which is because the opinion on the perception and classification of space varies from person to person.

In general, different art forms can be classified into several major types of art design creation, depending on spatial characteristics. The book <Formation 2> (Yangsong Shou, Li Lenhe, Lin Tingru, 2002) classifies the creative types of art design into 2D space, 3D space, and 4D space. The classification can be summarized as shown in the following table. The classification shown in the table above assumes a 'normal' situation and is based on the appearance shown in the piece of work. Therefore, it does not take into account the inherent meaning or the sense of space that the work tries to express. So, when analyzing and describing the temporal spatial characteristics of art creation, besides analyzing the appearance of the work, it is more important to analyze the temporal spatial expressions inherent in the work.

In <Universe of Water Particles, Transcending Boundaries>, the lines of the waterfall and the water streams, which is created by imitating 'real' streams of water falling from a waterfall,' is carefully drawn by a computer program after accurately calculating the interaction of water particles. From the perspective of traditional art, the 3D space is flattened to explore the underlying logical structure, and through the 'ultra subjective space,' the audience can have the most realistic experience as they participate in digital artworks. In other words, the works can be felt through physical changes and free movements operation within the space, and the boundaries between works and exhibition spaces are dismantled based on infinite possibilities. Through this process, space no longer remains as a fixed, physical, public space. It is transformed into a space for emotional interaction with the audience. Moreover, 'beauty' is no longer considered as a 'standard'. Instead, it becomes entertainment, fun, and a multi-dimensional experience that the audience can enjoy as they appreciate the exhibition. The aesthetic standards for exhibition art are no longer focused on the rather simple relationship between the artwork and the viewer. Now, the standards are more centered around the relationship of various experiences. This is the true embodiment of the 'sense of space, beyond the topic' and 'fluidity,' which is based on TeamLabs creative ideology of 'eliminating the boundaries'.

'Border lessness' provides new visual, auditory, and interaction stimuli by simulating through a computer, while enabling communication and interaction with other devices by utilizing a computer–simulated environment. Such unique action allows us to experience an interaction that we are standing in the middle of an imaginary space and helps us dive into the wonderful world of our imagination (Wang Nien Chan & Chen Wan Ru, 2007). Borderlessness allows the audience to fully immerse into media art, making them mistake virtual objects with real objects through their sensory system by using virtual objects to imitate real objects. Thanks to the advancement of technology, borderless
videos have become very realistic, and they are also presenting cutting-edge technologies such as linking with the user's posture in real life or replicating the user's actual voice. Such highly advanced imaging video technology provides a whole new path that could introduce us to a new perspective through our visual, auditory, and sensory system, allowing us to enter the unprecedented 'borderless space'.

4.2.3 Shareability

When the audience participates in 'shared media art,' not only does the role of the artist change, but also a 'behavioral emotional conversion' occurs between the expression of work and the participant. TeamLab's <Sketch Town> and <Sketch Aquarium> are two notable examples that demonstrate this phenomenon.

In <Sketch Town>, when a member of the audience draws a picture on the provided canvas, the number of that object gradually increases and shows up on the actual work to form an entire city. It is created by combining the expressive format of interactive graffiti and interactive walls.

By using a beam projector, the audience's work is extracted and projected on the empty floor and walls, while the audience's work stays on a certain space of the screen. This way, the audience's creative work will be on display, enabling a shared conversation communication between everyone present at the exhibition. Through <Sketch Town>, an emotional transition will occur throughout the entire participation process, starting from 'entrance' (entering the exhibition hall), 'curiosity' (after seeing their own work appearing on the screen), 'observation' (understanding why one's work is appearing on the screen), 'interaction' (through the movement of the body and playing games), 'feeling' ('enjoying' the entire experience by interacting with their own work), and 'leaving' (leaving the exhibition hall). The whole process is filled with a variety of emotions and reactions and plays a crucial role in spreading the inner emotions to others in addition to forming a platform where the participants can create their own work.

Fig. 5. Flutter of Butterflies Beyond Borders

The people who enter the room where <Flutter of Butterflies Beyond Borders> (Fig.5) is exhibited are not limited to the role of a simple 'audience'. By setting a specific situation, the audience feels an emotional need for the butterflies, or, on the contrary, gives feedback to the artist. They can also realize what the artists were trying to express about the interdependent relationship between humans and nature or life and death.

Unlike other forms of art, media art provides way more opportunities and freedom for the audience, minimizing geographic and cultural boundaries. Thus, media art found a new way for 'art' to escape from the 'sanctuary' and travel the world of network, reaching people around the world as a subject of 'interaction' and 'play,' rather than remaining as a subject that should only be seen afar and cannot be touched. In other words, the audience can also break away from their limited role as an 'isolated' audience who can only exist outside the border and become an 'executor' who can influence the work with their creativity.

In <Forest of Resonating Lamps - One Stroke>, 'light' provides a mental and physical experience for people who exist inside the space, and by adding a new dimension of 'time,' you can discover that the psychology of the audience changes over time. According to a comment made by Frank Popper, interactive work created using new media (based on science & technology) can be referred to as an 'open artwork'. These types of work go through a
continuous process of creation and modification through the dialogue with participants, emphasizing the aesthetics of 'Non–finito (unfinished)' as it's final goal is not about the 'completion' of the work. Moreover, it only exists momentarily and fragmentarily, is always a work in progress, and can be considered 'constantly volatile and open,' which means that it is in a state of being 'permanently shared'. This unique state of media art creates a space of imagination and openness, opening up a possibility for the audience to communicate with the work and participate in the creation process.

4.3 Sub–conclusion

TeamLab dismantles the boundaries of art and exhibition by using digital concepts to expand the concept of beauty, and uses physical space design to eliminate the boundaries of artwork completely. TeamLab's works successfully illustrate the ideas of 'loss' and 'convergence' that occurs in relationships between human–nature, human–artwork, and human–human.

TeamLab connected science and art with digital technology. Digital technology not only improves the quality of our lives, but it also adds more creativity to our artistic experience. Technology is also the expansion of human beings. The concept of 'digitalization' in itself is to expand human expression, which naturally means the expansion of artistic expression. Such expansion shall change the relationship between the artwork and the audience by opening the door for a whole new level of artistic experience. As a result, the emotions of the audience also changes. In this new form of art, the audience can explore and experience new heights as an active participant and even become part of the artwork. Through this process, the audience creates the artwork 'together,' and eventually 'empathize' with art. Moreover, by using advanced digital technologies (light, sound, video, virtual reality, digital interactive devices) as a medium, we can grant new languages with more in-depth, complex thought processes to the artwork, and the audience can think about their self, life, and nature as they interact with it.

5. Conclusion & Suggestions

In Relational Aesthetics, the artist is no longer at the center of the attention, nor is the creator, ruler, or star of the soul. It is not an exaggeration to say that the artist is just a catalyst or a medium. They stimulate our curiosity by asking new questions and making people think about everyday routines and things that they have considered 'ordinary'. The development of science has allowed people to share a single space. More and more artists are implementing new expressive/interactive techniques to their work. These kinds of work are 'operated' by the audience's reaction, and the audience unconsciously participates in the artwork.

The interaction between person–person and person–artwork in TeamLab's work is 'unintentional'. Instead, it 'naturally' induces the participation of the audience. The audience can casually take a look to discover the true meaning of the artwork, and through such an opportunity, they look back on the relationship between people, nature, and society to empathize and break down the boundaries.

Media art is sweeping the world with its new aesthetic values such as 'beyond realism,' 'border lessness,' and 'shareability'. Media art is not just a toy that someone can play with for a while and throw away, nor it is a simple replication of science and technology. The content delivered through media art eventually returns to the cultural aspect of the society, so the artists (and even the audience) must think carefully about the creation of media art. Besides, as the theoretical framework for new media is far from complete at this moment, I hope that this paper...
can present new academic topics that can be explored in the near future, and I wish that we can look back and reflect on the problematic phenomena that are occurring in the modern society based on the theory: 1) Observe the 'shareability' of media art. Media art is focused on the extension of self-consciousness and the creation of a 'control philosophy' through the aesthetics and free association based on the attitude of pure play during the process of sharing. Science and technology expand the form of expression and change the shared relationship between works of art and visitors. <Flutter of Butterflies>Beyond Borders>, <Sketch Town>, <Sketch Aquarium>, <Forest of Resonating Lamps> Oneke>, etc. are such examples. Works presented in the form of media art bring new experiences to the concept of art and create conditions forereating the relationship between art and humans. 2) The forms of media art are becoming more and more diverse, and motion picture technology is also developing at a rapid pace. Regardless of the application to digital technology or the originality of an artist, we shall not limit our learning capacity to a single field as in the past, and the ability to integrate various fields and cooperate with others will become a major trend in the development of media art. I hope that this study can provide an important theoretical basis for the study of media art practice. Among the series, works such as<Universe of Water Particles, Transcending Boundaries>, <Universe of Water Particles, Transcending Boundaries>, and <Body Immersive>, the works drawn with real-time calculations through computer graphics cannot be duplicated and are constantly changing. Therefore, the screens you meet at a specific moment will never appear again. The work applies a method that combines big data, engine real-time rendering, immersive and interactive experiences, etc., encompassing various areas such as animation, design, and new media, and shows the borderless characteristics of dynamic images, and features transcending reality. The work’s amazing originality and completely new media art form captivates the audience.

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