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A Case Study on Interactive Media Art Utilizing Touch Screens

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Abstract

Interactive media art is a contemporary art form that fundamentally relies on the active participation and interaction of visitors to reach its full potential. This art form is intricately connected to the ongoing advancements in touchscreen technology, which serve as the primary interface through which audiences engage with the artwork. Unlike traditional static art forms, interactive media art transforms visitors into active participants, whose interactions are essential for completing and continuously evolving the artistic experience. Artists and groups such as TeamLab and Miguel Chevalier are at the forefront of this innovative approach, using touchscreen technology to create immersive, dynamic environments. In these installations, visitors engage with the art through touch, gesture, and movement, which in turn influences and transforms the artwork in real time.The combination of touchscreen technology and artistic expression will redefine the boundaries of creativity. As artists continue to embrace these technological advances, audiences will experience innovative and innovative art that invites them to participate in new ways.

Keywords: interaction, media art, interactive media art, touchscreen, sensors, interaction

1. Introduction

Interactive media art is a branch of modern art and represents a unique art form in which works are completed through the participation and interaction of visitors. While traditional works of art are the object of one-way appreciation, interactive media art values the process by which visitors become part of the work and actively participate and create experiences. These characteristics are closely related to the development of digital technology, and in particular, the introduction of touch screen technology has revolutionized the way media art interacts.

Touch screen technology has developed from a simple touch input method and has evolved into various forms such as multi-touch, decompression recognition, and capacitance method. These technological advances enable the convergence of art and technology by providing artists with new creative tools, and provide visitors

with a richer and more immersive experience.

2. Theoretical background

2.1 Concept of Interactive Media Art

Interactive media art emerged in the 1960s as an art engineering that combines science and art, and after 1970, when technology expanded, modern interactive media art was actively involved in the work as a real-time experience. The dictionary meaning of 'interactive', the concept of interactive media art, means 'interactive', 'interacting', and 'computer interactive'. In other words, in interactive media art, interaction forms a relationship by forming internal and external exchanges between the audience and the work based on technology. Therefore, through interaction, the audience realizes the meaning of the work by acting as another producer who is involved in the flow, creates images by transforming the system, and creates sounds. These active interactions can be achieved through active body intervention. Interactions use input devices to interact with the senses of the senses of sight, hearing, touch, smell, and taste. In order for machines and humans to communicate, an interface that connects the two is naturally intended, and in art, the specific interface becomes consistent with the content of the work to the extent that it cannot be thought of as a separate dimension.

2.2 Use of touchscreen technology and media art

A touchscreen is a display screen that detects the location touched by a user, typically with a finger or hand. It functions by sensing the minute electrical signals from the user's fingertips, determining the touch location, and activating computer software based on the recognized position. For a touchscreen to operate, it requires a touch sensor, a screen equipped with a touchscreen, a controller card that drives the touchscreen and converts touch into coordinates, system software that enables communication between the controller card and the computer's operating system, and a liquid crystal display.

Developed in 1971, touchscreens have become deeply integrated into our daily lives with the commercialization of smartphones and tablet PCs. Touchscreens enable immediate feedback without the need for intermediary devices in the manipulation and execution stages between human hands and screen programs, leading to a change in the way we perceive. Hands, eyes, perception, and touch no longer act separately but interact together. This is especially significant in media art, where touchscreens play a crucial role in innovatively enhancing audience participation and interaction, providing new forms of immersive art experiences. Media art utilizing touchscreens manifests in various forms, such as responsive screens, real-time data visualization, game-like art pieces, and educational interactive learning tools. This technological application allows viewers to become active participants and part of the artwork, enabling personalized art experiences, expanding the scope of artistic expression, and offering multi-sensory immersive experiences. Throughout history, technology and art have mutually influenced and developed each other, with media art, in particular, being significantly impacted by technological advancements. The concept of touch, revitalized in late 20th-century new media art using interactive devices, transforms the world from an expansion of images to an expansion of experiences felt through the skin.

3. Case Study

3.1 TeamLab: <LIFE>

Teamlab: LIFE is an exhibition of works planned and produced by the art group Teamlab from September

25, 2020 to August 22, 2021, at Dongdaemun Design Plaza in Korea. It is an immersive experience exhibition that expresses a lively life with the motif of the beauty of continuous life felt in nature through new media art. The understanding of nature can be melted into each work so that not only can visitors change the work with a touch, but also it can become part of the entire exhibition work by becoming a part of the artwork, including butterflies, flowers, and virtual spaces of the sea through sensuous experiences. Teamlab's purpose is to make visitors feel beautiful in nature by experiencing media art content that changes in real time according to movement through the sensory elements of the exhibition.

3.1.1 TeamLab

TeamLab was a studio started in Japan in 2001 by Inoko Toshiyuki, a graduate of the Department of Engineering and Mathematics at the University of Tokyo, and has now become a convergence art group representing Japan. Currently, it has expanded to include works installed around the world and displays them in various locations such as hotel shopping malls, restaurants, and specific exhibition halls. They want to realize a "world without boundaries" through "expansion of art through digital," "relationship between art and humans," "overwhelming space and digital art," and "relieving the boundaries between art."

3.1.2 [Animals Living with Flowers II] Interactive Media Art

This work depicts an animal that moves with flowers in the background, showing the organic integration of natural sounds and emphasizing the delicate relationship between animals and plants. Flowers bloom in the form of animals and continue to form animals by repeating growth and wilting. The work obscures the boundary between a living being and a flower, exemplifies harmonious coexistence and creates interconnections. When the viewer touches the animals, the petals are scattered. The results of human intervention in the ecosystem are expressed through the scattering of petals and the disappearance of the animals. Various types of animals move in and out of the audience's surrounding spaces, sometimes making primitive cries, giving the impression of living with them. This allows you to passively observe the beauty of nature in detail, which changes in color, shape, and growth of animals living together according to the change of seasons rapidly develop, and although they are changing, they harmonize with each other. This experience triggers a reflection on nature's complex relationship and the importance of maintaining the balance of the ecosystem.
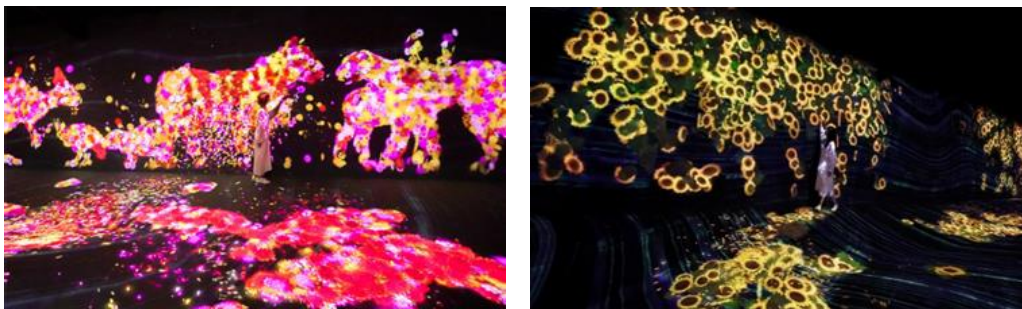

Figure 1. [Animals Living with Flowers II]

3.2 Miguel Chevalier <Digital Beauty>

Miguel Chevalier's exhibition "Digital Beauty" was held at the Ara Art Center in Jongno-gu, Seoul from January 18, 2023 to February 11, 2024. His huge works using generative art, interactive art, and virtual reality utilize five floors to create immersion by being installed and projected appropriately in the space. In addition

to the works, there are creative studios, brand collaboration booths, and art shops that visitors can experience directly, which consist of experiential exhibitions that can be seen and enjoyed directly. This exhibition presents in-depth insights into the natural environment and embodies organic and abstract movements in the works by using 2D and 3D technologies. Influences from 20th century kinetic art, op art, and geometric abstract paintings also appear in the works in a pleasant way. Through virtual world installation works, it creates an original visual language consisting of the flow of pixels and networks, and the geometry of algorithms, raising questions about the relationship between humans and reality**.**

3.2.1 Miguel Chevalier

Miguel Chevalier is a French digital artist and world-renowned contemporary artist. He has been presenting in-depth insights into the unknown natural environment for the past 40 years and has implemented organic and abstract movements in his works using 2D and 3D technologies. By fusing digital technology and art, his works come in various forms, including computer graphics, interactive, and digital projection mapping, mainly featuring virtual reality, interactive art, and a combination of light and color. Focusing primarily on nature, technology, and human relationships, it provides participatory and innovative digital art experiences, and its works are displayed around the world and receive a lot of attention as a pioneer of digital art.

3.2.2 [Complex Mesh] Interactive Media Art

Complex Mesh 2023 is a generative interactive VR installation work that embodies the flow of networks surrounding us as digital art. It maximizes the participation of visitors through various interactive elements and allows them to intuitively experience the complex networks of modern society. This work is designed to introduce a touch response system using a touch screen so that the network structure changes or a new pattern is created in real time according to the touch of the audience. In addition, it recognizes the movement of visitors using sensor technology and provides dynamic interactions in which the color, shape, and size of the network are transformed accordingly. The work reflects a real-time data feed and visualizes data such as Internet traffic and social media activities, thereby realizing the appearance of a living network. Through virtual reality (VR) and augmented reality (AR) technologies, visitors can immerse themselves more deeply in the work, and the entire exhibition space is transformed and expanded as part of the work through projection mapping. These interactive elements show that the 'net complex' is an organism that constantly changes and develops through interaction with visitors, and re-examine the network and interconnectivity of modern society from a new perspective. Also, like the infinite number of cases that can be made in the relationship between painting and light, we can gauge the artistic infinity that can be realized in the digital world through his works

FIGURE 3. [Complex Meshes]

4. Change and meaning of user experience

Interactive media art using touch screens has brought about innovative changes in the visitor experience, which suggests a new direction for contemporary art. Breaking away from the traditional art appreciation method, the audience can directly interact with the work through the touch screen. These interactions go beyond just visual appreciation, and provide an immersive experience accompanied by touch and movement. Works that respond immediately to the touch and movement of the audience enable a personalized art experience, and each viewer becomes a part of the work to create a new form. This breaks away from the fixedness of works of art and re-establish the concept of fluid and changing art. In addition, interactive media art using touch screens breaks down the boundaries between technology and art and explores new artistic expression methods suitable for the digital age. In this way, the audience experiences a deep connection with the work of art as an active participant, not just an observer, which maximizes the value of communication and interaction that modern art pursues. Many visitors experience a new level of immersion through this interaction, feeling a personal connection with the artwork while discovering a different kind of enjoyment compared to traditional art appreciation methods. As a result, viewers develop a deeper understanding and appreciation of art, fully realizing the value of communication and interaction that contemporary art aims to achieve.

5. Conclusion

Interactive media art utilizing touch screens offers an innovative artistic experience through the fusion of art and cutting-edge technology. Touchscreen technology significantly expands the creative possibilities for artists, enabling them to create experiences that are not only visually appealing but also deeply immersive and tailored to each visitor. This interactive approach transforms traditional passive art experiences into dynamic and participatory ones, allowing viewers to directly engage with the artwork and contribute to its evolution and meaning. Examples such as TeamLab's <LIFE> and Miguel Chevalier's <Digital Beauty> demonstrate the potential of interactive media art to expand artistic experiences through active participation and interaction by the audience. This shift from passive observation to active participation signifies a fundamental change in the perception and experience of art, encouraging viewers to become co-creators rather than mere observers. Such technological advancements are expected to further blur the boundaries between art and technology, creating a new artistic paradigm that emphasizes interactivity, personalization, and participation. As these boundaries dissolve, artists will have the ability to explore new forms of expression and communicate with audiences in deeper and more meaningful ways. Moreover, the integration of touch screens into media art is anticipated to foster the evolution of multidimensional spaces that combine visual, auditory, and tactile stimuli to create unique interactive art experiences. This evolution will not only captivate and engage audiences but also stimulate thought, inspire creativity, and promote a deeper understanding of the symbiotic relationship between art and technology. In conclusion, the synergy between touchscreen technology and artistic expression will redefine the boundaries of creativity, providing new avenues for exploration and interaction. As artists continue to embrace these technological advancements, the art world will undoubtedly witness the emergence of innovative and transformative artistic experiences that challenge traditional perceptions and invite audiences to engage in new and exciting ways. And the phenomenon of blurring boundaries between artists and audiences presents a new model of collaborative and participatory art, contributing to a reevaluation of the role of art in social and cultural contexts. Furthermore, the fusion of touchscreen technology and interactive media art will serve as important case studies in the fields of digital humanities, new media art, and creative industry research.

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