Article

Analysis and Research on the Future Development Directions of Digital Interactive Art

Yi Ding

Kookmin University, Seoul, 02707, Korea
Correspondence: dy_666@naver.com

Citation: Ding Y. (2024). Analysis and Research on the Future Development Directions of Digital Interactive Art. *Journal of Arts and Cultural Studies*, *3 (2)*, 1-14. https://doi.org/10.23112/acs24103101

Received: May 28, 2024
Revised: July 25, 2024
Accepted: August 28, 2024
Published: October 31, 2024

Abstract: ***Background:*** With the rapid development of digital technology, the expression of art is undergoing new changes. The continuous iteration and popularization of smart phones have made the traditional forms of display and communication insufficient to meet the spiritual needs of modern people in depth and breadth. ***Objective:*** This study aims to systematically examine the manifestations of digital interactive art through an in-depth analysis of cultural tourism policies, artistic expression methods, and industry trends, focusing on its functions and classifications, in order to foresee the future development direction of digital interactive art. ***Methods:*** This study adopts case analysis, literature review, and interdisciplinary approaches to analyze the role and influence of digital interactive art in artistic expression. ***Results:*** Digital interactive art provides a novel experience for understanding and experiencing artworks, aiming to maximize audience engagement and emotional resonance. ***Conclusion:*** The combination of art and technology has not only created new forms of expression but also profoundly influenced the audience's artistic experience and promoted the progress of social culture. As interactive installations, virtual reality (VR), augmented reality (AR), digital projection art, artificial intelligence (AI), and other technologies continue to integrate, focusing on sustainable energy use and interdisciplinary collaboration is crucial. This fusion of technology and art will bring revolutionary changes in the art field and play a vital role in education and cultural heritage.

Keywords: Digital Media Technology; Interactive Art; Interactive Installations; Virtual Reality (VR) Technology; Augmented Reality (AR)

1.Introduction

1.1 Research Background

With the advancement of science and technology, digital interactive art, as an emerging form of artistic expression, is gradually becoming a prominent example of the combination of contemporary art and technology. It expands the boundaries of art as well as profoundly influences people's aesthetic experience and interaction. The creation of interactive art has made art more inclusive and approachable (Sun, 2018). Studying the future direction of digital interactive art is of great theoretical and practical significance for understanding the evolutionary trends of contemporary art and promoting the deep integration of art and technology. According to forcast by International Data Corporation (IDC) for 2024, shipments of Augmented Reality (AR)/Virtual Reality (VR) headsets are expected to grow by 46.4%. The year 2024 is set to see significant recovery, driven by thefull-year availability of Meta's Quest 3 and Apple's Vision Pro. This is a contrast to the third quarter of 2023, when Meta was the market leader with a 55.2% share. The data shows that the hardware foundation for digital interactive art is continuing to be updated and iterative, and its reach is becoming increasingly pervasive, opening up new possibilities for artistic creation. While

traditional display methods usually only satisfy people's visual experience, today's digital media interactive technology elevates the content of the display to new heights, enabling the audience to be immersed in an all-around multi-sensory fusion of sight, sound, touch, and smell. Digital interactive art, through the interaction between digital technology and the audience, breaks through the static display mode of traditional art, giving the art work a new vitality and dynamism. This art form not only focuses on advanced digital technologies such as sensors, projection, VR, AR, etc., but also emphasizes the criticality of audience participation, thus making the art experience more accessible, enjoyable, and immersive. The author attempts to explore the internal logic and aesthetic characteristics of digital interactive art by sorting out its conceptual characteristics and artistic expressions, and further looks forward to the future development trend of artificial intelligence (AI) in the field of digital media.

1.2 Research Purpose

This study aims to construct a systematic digital interactive art model and its framework through analyzing the characteristics of digital interactive art and the expression of technology in art and elucidating the logic of its expression in digital interactive art. It also explores the unique aesthetic characteristics of digital interactive art and its aesthetic value in modern art appreciation. Finally, we will make a forward-looking outlook on the future development trend of digital interactive art.

1.3 Research Methods

1.3.1 Literature Analysis Method.

Obtaining literature through database platforms such as Zhi.com and Google Scholar, as well as domestic and foreign universities and archives, and organizing and researching the literature to form a scientific understanding of the research object, and discovering the development trajectory of the field of digital interactive art from multiple dimensions and perspectives; case study method. By listing a number of interactive art cases and classifying them into categories according to their unique typical characteristics and forms of expression, they are discussed and analyzed in detail. Through the discussion of specific cases, the “body-medium” relationship in interactive art is studied in depth, and the theoretical discussion is carried out based on actual practice objects.

1.3.2 Interdisciplinary Research Method.

This research covers a wide range of disciplines, including digital media technology, art, and interactive technology. By applying interdisciplinary thinking, we integrate and apply the theories, methods, and research results from these fields to throughly explore the development history, status quo, technical means, and artistic expression forms of interactive art and utilize these research results to analyze and look forward to the future trend of performing interactive art.

1.4 Research content

First of all, we conduct in-depth research on the background of digital interactive art, systematically organize relevant literature at home and abroad, and comprehensively analyze the characteristics of digital interactive art. Through this process, the potential value of digital interactive art is studied and explored, and a sufficient theoretical basis is provided. Secondly, it summarizes the various forms of expression of digital media technology and interactive art and deeply analyzes how these forms affect art creation and audience experience. Finally, the study will explore the future trends of digital interactive art, providing forward-looking insights and suggestions to guide future research and practice.

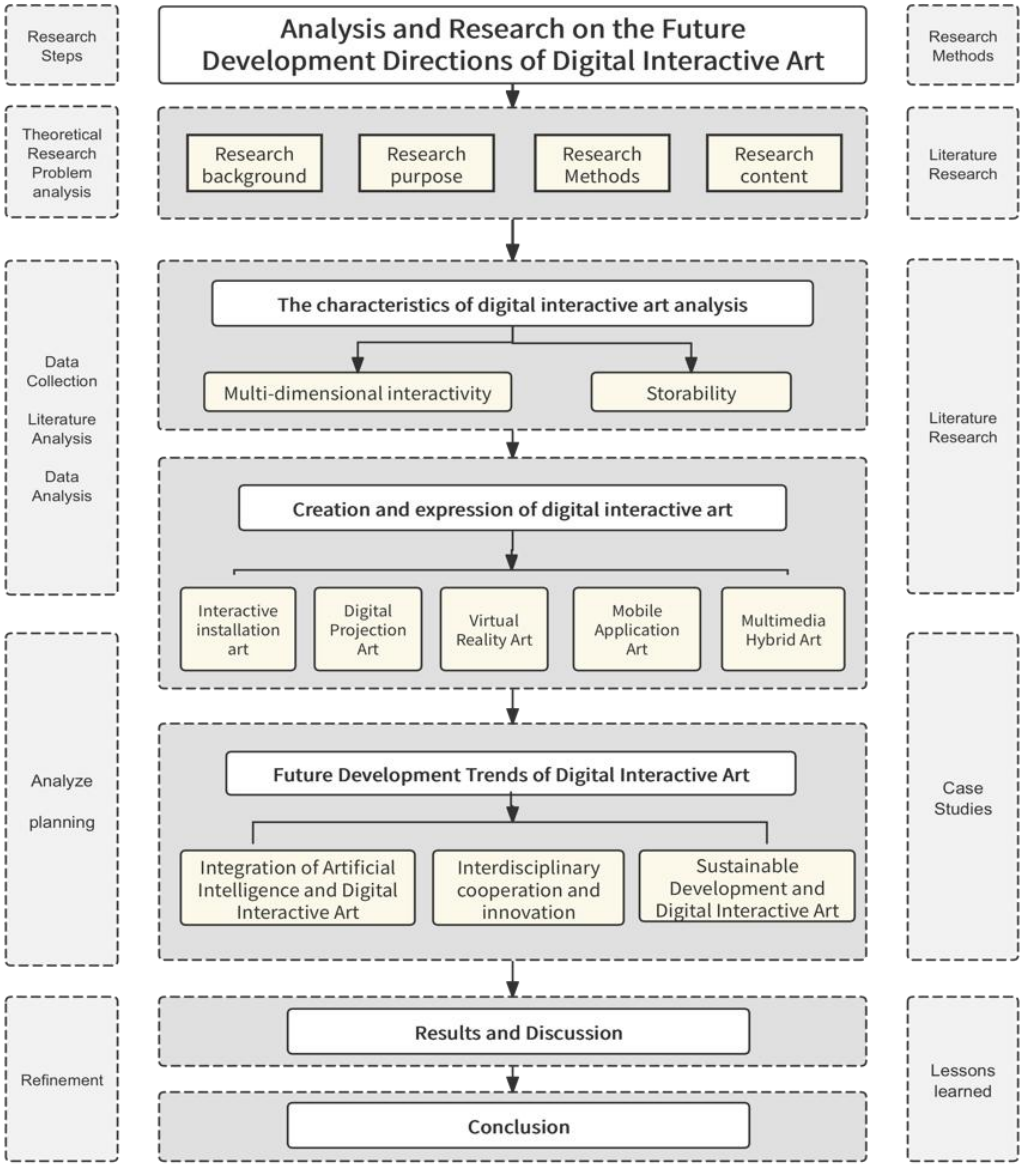


Figure 1: Frame Diagram

2. Literature Review

Currently, academic research on digital interactive art is primarily focused on three aspects.

2.1 The research on the concept of digital interactive art.

Paul Dourish introduced the concept of embodied interaction in "Where the Action Is: The Foundation of Embodied Interaction" (Dourish, 2001). Subsequent research identified six key design principles for embodied interaction. Wei Yanli, in "New Media Interactive Art," categorized digital art and interactive art as part of new media art. She argued that digital art emphasizes technical aspects while interactive art stresses participation, and proposed interaction models and evaluation methods based on the interactive characteristics of new media art (Wei, 2018). Zhao Xuetong highlighted the diverse characteristics and unique commercial value of digital interactive art in "Creative Presentation and Value Expression of Digital Interactive Art" (Zhao, 2019).

David England's "Whole Body Interaction: An Introduction" expanded on the concept of embodied interaction to propose whole-body interaction (England, 2011).

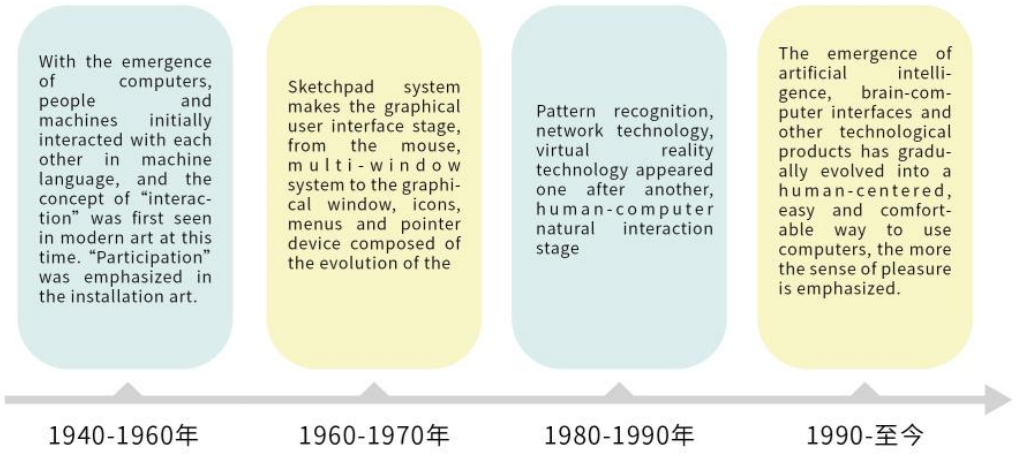


Figure 2: Historical Development of Digital Media Arts

2.2 Theoretical research on digital interactive art.

Hu Chuan explores the interaction between the body and media, real-time data collection and feedback, and the expression of crowd differences in three dimensions in "Design Research on Embodied Variable Typeface Interactive Installations" (Hu, 2024). Liu Yi et al. discuss the relationship between environmental media and embodied interaction in artistic therapeutic spaces in "Environmental Media and Embodied Interaction" (Liu, 2024). Li Min analyzes the perceptual, habitual, and aesthetic elements of digital interactive art from a multimodal perspective in "Exploration and Research on Multimodal Theory in Digital Media Interactive Art" (Li, 2024). Roy Ascott provides a detailed discussion on the evolution of interactive art design, intelligent art design, and creative ideologies in "The Future Is Now: Art, Technology, and Consciousness" with time as the main thread (Roy, 2012).

2.3 Research on the application of digital interactive art.

Wang Yiyi et al. investigated the experience satisfaction of new media interactive art in cultural heritage exhibitions and summarized its aesthetic characteristics in "Practical Application of New Media Interactive Art in Cultural Heritage Exhibitions" (Wang, 2024). Yangyang Xu analyzed the expression scene of new media interactive art in "Expression Design of New Media Interactive Art Based on Artificial Intelligence Technology" and integrated the topology by designing it from visual, multimedia, and human-computer interaction aspects (Xu, 2021). Tinglan Yang discussed the value of interactive installations in contemporary art exhibitions in "The Value of Interactive Installations for Contemporary Art Exhibitions" (Yang, 2023). Wang Tian and Li Changju explored the combination of virtual reality and network technology to create a new type of art centered on immersion and experience in "Virtual Reality - Applied Forms in Interactive Art" (Wang, 2013).

In conclusion, although there have been a large number of studies on the concept, value, and application of digital interactive art, these studies still have certain limitations. First, there are some problems in the application and development process of digital interactive art. Secondly, there are relatively few studies and outlooks on its future prospects. Therefore, this paper proposes to solve the existing problems while analyzing the characteristics and application research of digital interactive art.

Table 1: Summary of Literature Features

Research Direction	Reference	Trait
Aesthetic Research	"Aesthetic Research in New Media Art" "Dufhues: An Art World Interwoven with Aesthetics and Philosophy" "Artistic Crossovers Driven by New Media"	Contemporary art demonstrates the qualities of diversity, interactivity and virtuality, and the technical aspect explores the interactivity of digital media interactive technology and the unique experience of secondary creation. Cross-border integration expands the aesthetic characteristics of art and reshapes its intrinsic value.
Research on Digital Interactive Art and Technological Development	"Designing interactions" "Subiects After New Media"	The interactive medium of digital technology is changing the way people and things communicate, proposing a dichotomy between the viewability of traditional media and interactive digital media, thus highlighting the social significance of digital media art.
Theoretical Research on Gestural Interaction in Digital Interactive Art	"Interaction Design for and with the lived body: Some implications of Merleau-Ponty'sPhenomenology" "Embracing First-Person Perspectives in Soma-Based Design" A Review and Perspective of Research on the Human Factors of Somatic Interaction	The development of somatosensory interaction theory is sorted out, explored in depth from two aspects: self-cognition and kinesthetic creativity, and the concept of somatosensory interaction based on the first-person perspective is proposed to enable users to participate in digital interactions more intuitively, expanding the theory's connotation and application.

3 The Characteristics of Digital Interactive Art Analysis

3.1 Multi-Dimensional Interactivity

As early as the 1960s and 1970s, with the rise of video, mechanical and installation technologies, artists began to explore the creation of interactive art. However, interactive art at that time was still in a relatively preliminary stage and was more of an experimental attempt at technology. With the rapid development of AI, VR, somatosensory interaction, and other digital technologies, as well as a variety of new sensing technologies, interactive art gradually breaks through the technical limitations, revealing more possibilities and diversities, and gradually returning to the center of gravity of art itself. In this context, digital interactive art is born. Besides allowing the audience to change from the traditional one-way viewing mode to a multi-dimensional immersive experience, it also enables them to expand from a pure understanding of the five senses to a two-way or multi-directional dimension of interaction and to deeply feel the artist's creative intent. Through the combination of time, space, and multi-dimensional interactivity of the work, digital interactive art realizes a richer emotional interaction between the artist and the audience and between the audience and the audience. The audience is not only the observer of the work but also becomes the participant and co-creator of the work, and this interactivity gives the art work new vitality and expression. It is worth noting that although digital interactive art has revolutionized the expression of art, it is still essentially a media tool responsible for carrying and transmitting the artist's creative intent. Digital interactive art itself does not have the ability to generate emotion or self-expression, and it needs to rely on the creative thinking of the artist and the audience's emotional investment to really play its role. The artist's creation can show richer forms and interactivity through the support of digital technology, but the final emotional resonance still relies on human perception and understanding.

3.2 Storability

The significant advantage of digital interactive art is that it can be stored for a long time and is not easily damaged. Compared with traditional media forms, such as CD-ROMs and paper products, which are susceptible to physical damage and material

consumption, digital interactive art has a unique advantage in storage and maintenance. Not only are traditional forms of media susceptible to natural wear and tear, but artwork can also be damaged by violent handling or mishandling. In contrast, the advent of digital media provides an effective solution to these problems. Through network transmission, hard disk backup, and cloud storage, digital interactive artworks can be managed and downloaded anytime and anywhere, greatly reducing the risk of physical damage. This security and convenience not only allow curators and artists to maintain and promote their works more easily, but also make the dissemination and preservation of artworks more efficient and reliable. Digital interactive artworks can be easily reproduced, shared, and displayed, breaking through the time and space limitations of traditional art. In this digital age, artists can not only better protect their works but also establish a closer connection with the global audience through digital media, greatly expanding the influence of art.

4 Creation and Expression of Digital Interactive Art

4.1 Interactive Installation Art

As one of the important forms of digital interactive art, interactive installation art creates a new art experience by combining advanced sensor technology, multimedia technology, and audience participation. This form of art attracts the audience's visual and auditory senses and also stimulates their sense of touch and even emotional response through interactivity, so as to achieve a deep communication between art and the audience. For example, Refik Anadol transforms data sets into dynamic visual art through data visualization and spatial design, presenting abstract conceptual data in the form of light and shadow. The audience changes the form and color of the artwork by touching and moving, and this interactivity enhances the attractiveness of the artwork and enables the artwork to respond to the audience's behavior and emotions.

Figure 3: "Bubbles and Wizards" Interactive Art Installation
Source: http://www.gybn100.com/?news=hyzx-57

Figure 3 shows Bubbles and Wizards, an interactive art installation about light at the Sydney International Festival of Lights 2019, where each experiencer is able to transform into a wizard and interact with shimmering and glowing bubbles that are blown. The light and dark changes of the bubbles will occur as an overall gradient according to the interaction of the experiencers, creating a very dreamy effect. Through these cases, it can be seen that interactive installation art has great potential in the aspect of edutainment and environmental awareness enhancement.

4.2 Digital Projection Art

Digital projection art is an art form that uses digital projection technology to present dynamic images and visual effects on a physical surface, creating an immersive visual experience. With the advancement of technology, digital projection art is no longer limited to traditional static displays. Through the integration of moving images, interactive elements and the environment, it provides a new way of viewing art for the audience. For example, by utilizing projection mapping technology, the surface of the city's iconic buildings is transformed into a dynamic canvas, creating a stunning visual effect. In the future development direction of digital interactive art, with the

improvement of resolution and brightness of projection technology, as well as the reduction of cost, digital projection art is gradually becoming a new tool for expressing creativity, and in terms of sustainable development, digital projection art does not require physical alteration to change the visual effect of space, thus reducing the impact on the environment.

4.3 Virtual Reality Art

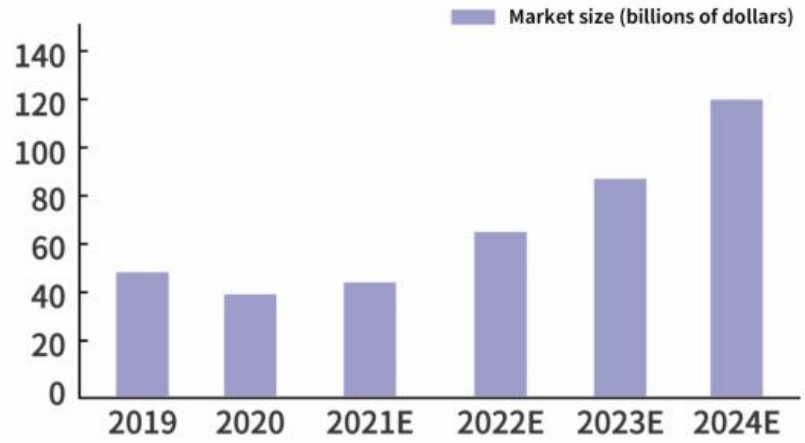


Figure 4: Global VR Market Revenue Scale (Compiled by the Author)
Data Source: Slalista, 36Kr Research Institute, Industrial Securities Economic and Financial Research Institute

Virtual reality, as an important part of digital interactive art, is leading a revolutionary change in artistic expression. With the continuous progress of technology, VR technology has evolved from a rough experience in the early days to one that can provide an immersive, high-fidelity interactive experience today. As shown in Figure 4, the global VR/AR industry market size in 2020 will be $3.89 billion, a year-on-year decline of 22%, mainly affected by the epidemic Black Swan event and the global capital winter. And with the rise of the meta-universe, capital rebound, and end-user acceptance of VR/AR, the market size is expected to continue to climb. It is expected that in 2024, the global VR/AR industry market size will reach $12.19 billion, and the compound growth rate from 2021-2024 may exceed 36%. This growth not only reflects the maturity of the technology but also demonstrates the widespread acceptance of and interest in VR technology among consumers and the art world.

Figure 5: “Eternal Notre Dame” VR Digital Immersion Exhibition
Source: https://export.shobserver.com/baijiahao/html/772271.html

In the field of digital interactive art, the application of VR technology has gone beyond the traditional scope of visual art, by creating an all-encompassing virtual environment, it allows the audience to experience the artwork in a completely new way.Chris Milk once said:

> "*Virtual reality is the ultimate sympathy machine. It allows people to experience things immersively, and then they understand things that they couldn't understand in any way before*" (CM)

His work *Clouds Over Sidra* takes viewers into a Syrian refugee camp through VR technology, allowing viewers to experience the living conditions of the refugees firsthand, thus inspiring sympathy and concern for social issues. After an accidental fire destroyed the spire and attic roof of Notre Dame de Paris in 2019, the historic building was closed for reconstruction and has yet to officially open to the public. Therefore, in 2024, as shown in Figure 5, the Shanghai Exhibition Center will allow people to virtually "tour" Notre Dame through VR digital art technology which is not only for fun, but also for aesthetic education. One can enjoy the sense of seeing Notre Dame abroad without leaving home, and its application is not limited to enhancing the visual experience, as it also covers multi-sensory stimulation of the senses of hearing, touch, and even smell. This comprehensive sensory experience enables the art work to establish a deeper emotional resonance with the audience.

Figure 6: Interactive Movie
Source: https://baijiahao.baidu.com/s?id=1807144531383159793&wfr=spider&for=pc

The creation of VR art requires traditional artistic skills and mastery of digital technologies such as programming, 3D modeling, and interaction design. This interdisciplinary approach to creation prompts close collaboration with technologists to promote innovation in artistic expression. As shown in Figure 6, the interactivity of interactive movies is reflected in the fact that viewers can influence the development of the plot by choosing different options during the viewing process. This multi-threaded, non-linear narrative allows viewers to see completely different storylines and endings, resulting in a strong sense of immersion and participation. The development of interactive film has also been influenced by digital technology and computer programs, allowing viewers to participate in the development of the plot through interactive sessions and feel an unprecedented viewing experience and psychological changes. This form of movie not only enhances the audience's sense of participation and experience but also brings new economic value and development opportunities for the movie industry.

4.4 Mobile Application Art

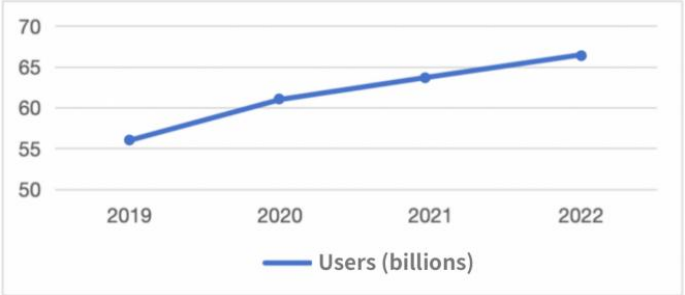


Figure 7: Number of Smartphone Users Worldwide

Source: Statista

With the popularization of smartphones and tablet computers, mobile application art has become an increasingly important branch in the field of digital interactive art. Mobile application art not only provides users with the convenience of accessing art anytime and anywhere, but also provides them with a new creative platform and means of expression through the integration of touch screens, accelerometers, GPS, and other devices. As shown in Figure 7, according to Statista statistics, the total size of global cell phone users in 2019-2022 shows a stable year-on-year trend, but the growth rate shows a constant downward trend. In 2021, the global cell phone users were 6.378 billion users, with a year-on-year growth of 5.3%; in 2022, the size of the global smartphone users was further increased to 6.648 billion, with a year-on-year growth of 4.2%. In the practice of mobile application art, we utilize the characteristics of these devices to create works that can deeply interact with users. Geolocation artworks created with GPS technology are able to display art content related to the user's specific location, thus realizing the interaction between art and the environment. In addition, through the multi-touch function of the touch screen, we can design artworks that require users to participate in the operation in order to complete, and this participation greatly enhances the immersion of the art experience. As shown in Figure 8, Google collaborated with the Singapore Tourism Board to implement an AR guided tour using ARCore and Google's new geospatial creator in Unity. Visitors are guided by Merli, the Singapore mascot, to explore the city's unique flavor. They are introduced to Singapore's various attractions and cultural heritage in a lively and entertaining way. The mascot takes them on an immersive tour of Singapore's iconic landmarks and experience the local flavor. It also present an animated show that uses cell phones or other AR devices to find hidden attractions in landmarks and streets. Thus, the visitors can delve into Singapore's history, culture, and traditions while engaging in a variety of interactive games.

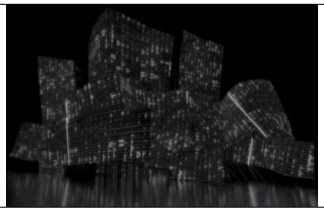
Figure 8: "Merli Immersive Adventure"
Source: https://news.nweon.com/117563

Additionally, at Taikoo Li in Chengdu, China, Yayoi Kusama, the "Queen of Polka Dots," was honored with AR technology by combining her famous "Flower" series of installations with Taikoo Li pumpkins, which introduced viewers to a psychedelic world of reality and reality as such. This unique visual experience quickly became a popular place to take photos and greatly enhanced the communication effect.

4.5 Multimedia Hybrid Art

Multimedia hybrid art has obvious characteristics; not only interactivity and immersion, but also integration is its main unique characteristic, through the combination of video, audio, animation, 3D modeling, and other media, to create a new art experience. Using projection mapping technology to project dynamic images onto irregular material surfaces, the movement of the audience can change the flow and color of the images, thus realizing real-time interaction between people and artworks. This form of art enriches the audience's sensory experience and also expands the boundaries of artistic expression.

Table 2: Multimedia Hybrid Art

Research Direction	Reference	Trait
Symphony Am é riques		As the symphony played out at Disney Hall, Anadol created a dynamic visualization program that used custom algorithms to listen analyze and respond to the music in real time
PLAY^2		With PLAY^2 by the Moment Factory team, the game is transformed into a "sports arena". This is a multimedia interactive game exhibition that brings the game from the screen to the real world.
Los Angeles Philharmonic celebrates centennial year		It is an animated, data-driven model that projects images of the Philharmonic onto Disney Concert Hall. The designers wanted to create an artificial "brain" that would allow data and images to be combined to mimic the sensations of a human dream.

It is through its unique interactivity and immersion that multimedia hybrid art provides a new life experience for the audience. It not only changes the interactive or immersive relationship between the art work and the audience but also promotes the deep integration of art and science and technology, heralding the infinite possibilities of the future development of digital interactive art.

5 Future Trends of Digital Interactive Art

5.1 Integration of Artificial Intelligence and Digital Interactive Art

With the rise of AI, digital interactive art is ushering in unprecedented innovation opportunities. It provides new creative tools and expands the possibility of artistic expression to a great extent. Through AI algorithms, the content or presentation of artworks can be adjusted in real time according to audience response, thus realizing a truly personalized experience and breaking the limitations of static display of traditional artworks. As shown in Figure 9, for the 2023 Taiwan Lantern Festival, Ouchhh created the world's first AI maze data sculpture, Portkey of the Maze_PX 25, which uses LED panels on the surface of the installation, and the abstract movement and composition of the changing animation that the viewer sees from the outside is transformed through 5G-connected data sources, including a 5G-connected data source. Connected data sources, including the city's instantaneous population density, MRT, bus ridership, etc. on a 50*50 meter grid. The synchronized delivery dimension of such a wide range of data inputs and real-time generation of renderings is a groundbreaking technological challenge; however, it also presents new challenges and opportunities as AI technology continues to deepen in digital interactive art. Its development has triggered discussions on ethics and privacy, especially when dealing with audience data; how to ensure that personal privacy is not violated has become a pressing issue.

Figure 9: World's First Artificial Intelligence Maze Data Sculpture

Source: https://it.sohu.com/a/716237764_121124776

5.2 Interdisciplinary Cooperation and Innovation

In the future development of digital interactive art, interdisciplinary cooperation and innovation become more and more important. As the boundaries between art and science and technology are gradually blurred, cross-disciplinary collaboration has become the core driving force to promote the progress of digital interactive art. The 2022 Winter Olympics closing ceremony is still based on the "story of a snowflake" as a clue to the theme of "one world, one family." The closing ceremony of the 2022 Winter Olympics still takes "the story of a snowflake" as a clue to tell the theme of "one world, one family." Twelve Chinese zodiac ice cars to wheel traces pressure out of the "Chinese knot," 14 meters in diameter ice sculpture snowflakes hanging in the center of the Bird's Nest, 365 beams of green LED willow branches, ice cubes by the laser constantly carving traction, etc., the realization of these visual and interactive effects, inseparable from the artificial intelligence, kinetic capture tracking system, fuel kinetic energy, lasers, LED devices, VR, AR, and Naked Eye 3D. These technologies not only provide the audience with a stunning sensory experience. This is an example of the integration of digital interactive art and technology and also marks a new direction for future artistic expression. In this process, the integration of art and technology is no longer just a combination of tools but a deep dialog between creativity and technology. Through this interdisciplinary cooperation, it witnesses the infinite possibilities of digital interactive art and its great potential to demonstrate the power of national scientific and technological innovation on the global stage.

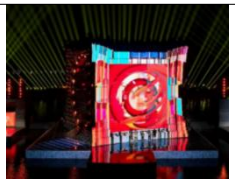
5.3 Sustainable Development and Digital Interactive Art

When exploring the future development direction of digital interactive art, sustainable development has become an important topic that cannot be ignored. As an emerging art form, the creation and display of digital interactive art often rely on advanced technology and resource consumption. Therefore, how to find a balance between art creation and environmental protection has become a common challenge with technology developers. The combination of sustainability and digital interactive art can take many forms. Reducing carbon footprints by designing energy-efficient interactive experiences. For example, using solar panels to power outdoor interactive installations not only reduces reliance on traditional energy sources but also raises public awareness of sustainable energy. Interactive artworks can also be used to convey the importance of environmental protection and stimulate public awareness of environmental protection. The use of interactive installation art to simulate the effects of climate change allows viewers to experience the consequences of environmental change through hands-on participation, thus enhancing their sense of urgency for environmental protection and becoming not only an aesthetic experience but also an educational tool that guides people to think about how to practice the concept of sustainable development in their daily lives.

The path of sustainable development of digital interactive art requires us to pay attention to the cutting-edge of technologyand also to deeply explore its far-reaching social, cultural, and ethical impacts. The creation and display of digital interactive artworks increasingly rely on energy-intensive computing resources and advanced hardware devices. Therefore, it has become imperative to promote green computing and energy efficiency in digital art. Adopting cloud computing and edge computing technologies can effectively reduce the energy consumption of data centers while ensuring the smooth display of artworks.

Table 3: Future Trends in Digital Interactive Art

Research Direction	Reference	Trait

Convergence of Artificial Intelligence and Digital Interactive Art		Artificial intelligence technology is applied to the choreography, music composition, choreography, and creative conceptualization of the work.
Big Data-Driven Innovation in Digital Interactive Art		Lighting, sound effects, dance, and other elements of stage art can be innovated through the application of data. Through sensors and real-time data analytics, stage art can interact and adjust to audience feedback and mood changes and provide a personalized performance experience.
Interdisciplinary Cooperation and Innovation		AR, kinect real-time motion capture, new media interactive devices and other digital creativity and program integration, in the symbol of the "circle of heaven and earth" ancient philosophical concept of digital creativity stage modeling, the use of national comics, the national tide of elements to create a presentation of the unique romantic culture of the Chinese people.

6 Results and Discussion

Digital interactive art applied to enhance the expressive presentation of contemporary art is one of the most valuable and efficient ways for art creation and presentation in the future trend. This thesis proceeds one by one from 1 to 5 in order to demonstrate its unique advantages in interactivity and diversity. Given the core function of digital interactive art, the use of multiple technological means to display and create artworks can be seen as an innovative and efficient way of expression. As a new experience for understanding and experiencing artworks, digital interactive art aims to maximize the audience's interactive participation and emotional resonance towards art.

7 Conclusion

The combination of art and technology is no longer limited to creating new forms of expression but also plays an important role in shaping the audience's artistic experience and promoting social and cultural progress. Interactive installation art, through the direct participation of the audience, enables the art works to be dynamically adjusted according to the interactive feedback, breaking the traditional mode of passive appreciation of art and giving the works new vitality. Digital projection art utilizes advanced projection technology to accurately map dynamic art content onto various media, creating an immersive visual experience that changes the audience's perception of space and art. VR Art brings viewers into a virtual world entirely designed by the artist through VR technology, allowing them to experience an unprecedented immersive art experience. The audience can explore freely in the virtual space and also interact with the elements in the virtual world, feeling the infinite possibilities of art given by technology. Looking ahead, the deep integration of AI and digital interactive art will further enhance the personalization and interactivity of artworks. By analyzing the audience's needs, personality, and points of interest in real time, AI will be able to dynamically adjust the art content to provide an interactive experience that is closer to the audience's heart. This convergence will not only revolutionize the art field but will also play an important role in education and cultural transmission, while at the same time protecting the audience's privacy as well as low energy consumption and high efficiency. Presenting the logical story behind the art in an interactive form will be entertaining and educational and also serve as an important tool for cultural transmission, helping to preserve and disseminate art forms and cultural knowledge that are on the verge of being lost and to ensure that they are perpetuated and carried forward in the digital age.

Funding: This research received no external funding.

Acknowledgments: Not applicable.

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: Not applicable.

Conflicts of Interest: The authors declare no conflict of interest. This paper has no other sponsors besides the author herself. No other people had any role in the design of the study, in the collection of data, analyses, or interpretation of data, writing of the manuscript, or in the decision to publish the results.

References

Dourish, P. (2001). *Where the action is: The foundations of embodied interaction* (Vol. 210). MIT Press.

England, D. (2011). *Whole body interaction: An introduction*. Springer London.

Guo, Y. (2012). *Aesthetic research on new media art* (Master's thesis), Jishou University. https://kns.cnki.net/kcms2/article/abstract?v=_dQyPpHgqRu6QI8SP-G7wN-0qCVsD_ZWpQ5YLKcGIAK6y9Qun7HV0uTv59OkCrnWi9CKxDWrQx6p_ gBjdjlaFlMUICL6WbdGd-F0MJ1hpgQGzO6xmNOkj_RjhAFGRD7fUlD3S8vKB4Duhm0fbNapGVXA3vWMissQlrg7PYnEETKQ3metHmkqkS3Esp0DsPGf08RYe4A4W6Y=& uniplatform=NZKPT&language=CHS

Höök, K., Caramiaux, B., Erkut, C., Forlizzi, J., Hajinejad, N., Haller, M., ... & Tobiasson, H. (2018). Embracing first-person perspectives in soma-based design. *Informatics*, 5(1), 8. https://doi.org/10.3390/informatics5010008

Hu, C. (2024). A study on the design of embodied variable font interaction device. *Art Education Research, 11*, 110-112. https://kns.cnki.net/kcms2/article/abstract?v=_dQyPpHgqRvncyh0- 6HmOEJD7BH9zFE6V7iuaMH4jLflexWKzH0lgWdjVCJK2Rzd9MHqCUNFCM0oFsB_3OuSzC9v8cTjB248BijyhfahPsVKGAHrWGEoyeQwaVcRD7zXS97S8zGVg- Ac0i1bDq7WOpsCGqZxFzU26hznX_WjZZMm8x4wQWeGdnIM-DWREhNw7yyrfDMPci4=&uniplatform=NZKPT&language=CHS

Li, M. (2024). Exploration and research of multimodal theory in digital media interactive art. *Western Radio and Television*, *01*, 50-54. https://kns.cnki.net/kcms2/article/abstract?v=_dQyPpHgqRsBlULuEEC67K-dmeOzBmWbZgYqCvxhKdBnT- RiUeyyWzycbZSfWHguzYsbhF3z312uIG5Ir9OQWS46KF-IWinxD5z67rdLZLIYCMazeFVU5KxN9Cpt2XbxnTZYxjgqxqTHR2KOG0EXaIwP_cDK_NqBUKap-KeEmsvWAkfM -maIFbiriQEwNIuDKCWgb45zTtc=&uniplatform=NZKPT&language=CHS

Liu, Y., Xie, D.M. & Zhou, A. (2024). Environmental media and embodied interaction: hotspots and trends in art healing spaces. *Industrial Engineering Design*, *02*, 85-92. doi:10.19798/j.cnki.2096-6946.2024.02.010.

Luo, L. (2017). Dufresne: The art world where aesthetics and philosophy intertwine. *Art Contemporary*, *05*, 40-43. https://kns.cnki.net/kcms2/article/abstract?v=_dQyPpHgqRs6DMgDAxxnp8tkNWDV634AhZMTtzfOwk0V1eelINa1o3JIup0ORQRZofnr- opoXXxW_IWLpRoszUwMFUjmPrqt2G3tDh2JCxNzSVDuEhCIbSDh0DOEuNsFdxysoZUS5F1AatfIQTjFpLzEmSdRVfyV4De63IDHlUS8n6MqrePJNQ8YRtQZ- k2rYmlLbejNWbM=&uniplatform=NZKPT&language=CHS

Moggridge, B. I. L. L. (2007). Designing interactions.

Pang, X.Y., Guo, R.Z., Yao, N.P., Yu, J.L., Yu, S.X., Wang, C. & Gao, Z.F. (2014). A review and prospect of research on the human factors of somatosensory interaction. *Applied Psychology*, *03*, 243-251. https://kns.cnki.net/kcms2/article/abstract?v=_dQyPpHgqRuNEtf7NVjXIWImtNJMU6hPy3pND5UyZVAlS0eIQLTymY- 3nETnPZ7HDUpb_mNJyajUJ7- lf02Z6Ku3zIY82OB7RGNmevHFH5B16E8ZCmoLxkjHbPCs3Ry5k1nFrBku3igwf1vV4KrhjILOGAOxKum9yZTfsmBslLAtcWzPSc0r0rJO4xLyiyIdxtRp4SyGoaM=& uniplatform=NZKPT&language=CHS

Roy Ascott. （2012）. *The future is now: art, technology and consciousness* (Y. Xiaodi, Z. Ling & R. Aifan, Trans.). Jin Cheng Publishing. ISBN: 9787515503516

Stiles, C., & Shanken, E. (2012). Lost in battle: Agency and meaning in interactive art. In M. Lovejoy, C. Paul, & V. Wisner (Eds.), *The contextual provider: The condition of meaning in media art* (pp. 18-20). Jincheng Publishing House.

Sun, S. Y. (2018). How broadcasting networks respond to the challenges of the 5G era. *China Cable TV*, *12*, 1359-1361. https://kns.cnki.net/kcms2/article/abstract?v=_dQyPpHgqRt3WhvELDstKPkPGxsLAUHNmaJQc9c1d3rUq8IA_SYqGwmwgvL8uBYJT2PX8JkpqhOgK8lX0O8CRIaKe_SnkVROliz8APbde3ZkI8xPU-lXriaYPl-m5_nywBhjvNZ9MVCKW1pUFgB9PfNxOiAqWs7oCVnJHR_PFgNI7pU6iVG4L_lVHM9BiDrZuhW1EhfDtQk=&uniplatform=NZKPT&language=CHS

Svanæs, D. (2013). Interaction design for and with the lived body: some implications of Merleau-Ponty's phenomenology. *ACM transactions on computer-human interaction (TOCHI)*, *20*(1), 1-30. https://doi.org/10.1145/2442106.2442114

Walden, E. (2006). Subjects after new media. *Quarterly Review of Film and Video*, *23*(1), 45-53. https://doi.org/10.1080/10509200490476797

Wang, T. & Li, C.J. (2013). Virtual Reality - Applied Forms in Interactive Art. *Art Education*, *07*, 189. https://kns.cnki.net/kcms2/article/abstract?v=_dQyPpHgqRsP__o2otNnxLiT3UG9HrKeLzVYkmXTrcmwUYBbilL-1zc6n9-Kro_ 3HHrcEgeA130SD0r_pdkrhj-nS_PJxcZXmdftS_lT6180bystZAVfvSHztKzxCykjZZeDwnyALHZrWZkebS2B95swU0FjYHmRluYMi9yBJHb3_9X1-hxMKJDZB6BM4Hcc& uniplatform=NZKPT&language=CHS

Wang, Y.Y., Chao, Y.Q. & Zhao, L.M.. (2024). Practical Application of New Media Interactive Art in Cultural Heritage Exhibitions. *Art Dazhan*, *03*, 109-112. https://kns.cnki.net/kcms2/article/abstract?v=_dQyPpHgqRtCrXjCSkY-EudRbC4sjucFYO7q- LKVfko5YmzelFy6otM0J8ughEsCF8SmLiRZjo3hBE6l27ZPvaflFN3IQ4CG6Vk48iHmI52FkcaHqKFVzsEYclxwX9AnrIEIX7ToTEgTH0iFvh-9- mCHJVtQaT2VUysMhQwc3-3aVK-zQ1AQ8ctZQHIWdrBI5ifZeBCdkbY=&uniplatform=NZKPT&language=CHS

Wei, Y.L. (2018). *The Art of New Media Interaction*. Chemical Industry Press. ISBN::9787122312655

Xu, Y. Y. (2021). New Media Interactive Art Expression Design Based on Artificial Intelligence Technology. *Automation Technology and Application*, 04, 182-186. https://kns.cnki.net/kcms2/article/abstract?v=_dQyPpHgqRsvwlNzu8GLD-tlY_ oCOGdBOs7izZFcOHbF7BkoCfspAUmtyEQTjq9GxvdNYP6dXSjOQXQYTXcfWaRsvKFGpwfmrTQnS3R1Pnae8w_ 3RGAJUO9R5ZTAGZ84crCS25Yy1R8znAbq2q0MAAclGU5VesrivwPCIeSAj78y7o2YSVpEgQt86sDV4Bw3eZ_-k1OBHIw=&uniplatform=NZKPT&language=CHS

Yang, T.L. (2023). The Value of Interactive Installations for Contemporary Art Exhibitions. *Art Appreciation*, *03*, 127-130. https://kns.cnki.net/kcms2/article/abstract?v=_ dQyPpHgqRtDts651DKdtG8O9elL8F4EGo33zGn0q3Rz1q0B4yDs2JwNzq5WiRlxrLPp9WUk_bSMMo8u8faUJJnEbp- zk7igpHcTlzitrTfG0VftBaKAfw85vpL77925b3IkR6QidfXpaqwtzqpk2TFVOMg6q4auj8cJlhlYZlCKieMR1qjE4vGdPXJO1BevkIUH3OlT-TY=&uniplatform= NZKPT&language=CHS

Zhao, X.D. (2019). *Creative Presentation and Value Expression of Digital Interactive Art* (Master's thesis, Shenzhen University). https://kns.cnki.net/kcms2/article/abstract?v=_dQyPpHgqRsjinyGoNQO3o_PooLT- xzsIGLYWYpK5jUt7d4ghOg747myu8JVXyCsuTWbYXfWrrqOcOsSkF80D6omuhJUaOHqMfIRFvbB13-YK_PfULE1B_YeFKvEgYlsQ84TJ0CLaf5Gk__ Lh9vQytbirXsSi8RU-BMLwx_HGeFqgXbnq1v6PF9GHyS0oLX0NHqai13Fq4A=&uniplatform=NZKPT&language=CHS

Zhu, F. (2019). New media-driven art crossover. *News Communication*, *12*, 47-48. https://kns.cnki.net/kcms2/article/abstract?v=_dQyPpHgqRuJxdjdjNQAMPhWri6z1kT_GLC2xw2j8yVezwB49SKxePEB5EyaJs- sAEiewVepFi1JeBrpS0MwaN5qwr2eivz4wDh-0PqFHyxcFqaGaxizEeIBi-7PfE7i6Imp-dRUnRjJnCGbP6XXaldOeWdhaYJtI2_5eafpbVgQklIgBqY2cncqkjog5- qhsFbg1c0JpTk=&uniplatform=NZKPT&language=CHS