

RESEARCH ON DIGITAL ART INNOVATION OF TRADITIONAL CULTURE : A CASE STUDY ON 24 SOLAR TERMS



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Abstract

This study examines digital art innovation strategies for China's 24 Solar Terms, a cultural system reflecting natural cycles, agrarian practices, and philosophical traditions. By analyzing artworks (digital paintings, animations, interactive installations) sourced from academic databases, public repositories, and case studies, the research maps current creative practices and identifies gaps in cultural digitization. Data on artwork themes, mediums, and regional variations were systematically categorized using Excel, enabling cross-dimensional analysis of technical, cultural, and audience engagement metrics.

Results indicate that digital reinterpretations of the Solar Terms prioritize immersive storytelling (e.g., VR folk rituals), regional adaptability (e.g., coastal vs. inland motifs), and participatory design (e.g., gamified agricultural simulations). However, challenges persist in technological integration and global outreach. To address these, the study proposes: 1) leveraging VR/AR/MR for multisensory cultural experiences; 2) embedding Solar Term education within digital literacy initiatives; 3) fostering crowdsourced platforms for collaborative art creation; and 4) optimizing algorithm-driven marketing to expand audience reach.

Theoretical contributions include a framework for reconciling intangible heritage with digital modernity, while practical implications highlight scalable models for cultural-tech synergies. By bridging aesthetic traditions with emerging technologies, this research advances strategies to sustain cultural relevance in a globalized digital economy

Keyword: digital art, traditional culture, 24 Solar Terms

Introduction

With the policy support of promoting excellent traditional culture, the digital innovation of traditional culture has been increasingly valued by the industry and academia. With the improvement of the Internet and digital technology environment, as well as the rapid development of cultural industries

and the cultural creative economy, the application of digital media has become one of the important ways to inherit traditional culture in the digital age. Currently, the Chinese government has issued the “Law of the People’s Republic of China on the Protection of Intangible Cultural Heritage” (Government of China Website, 2011), which provides legal protection for the development of traditional culture and lays the foundation for documentation and dissemination. The “Opinions on Implementing the Inheritance and Development Project of Fine Traditional Chinese Culture” (Xinhua News Agency, 2017) explicitly proposes to promote the creative transformation and innovative development of traditional culture, as well as digital construction. This includes using modern technological means to reinterpret traditional culture, build digital resource libraries, and expand online dissemination channels. The “14th Five-Year Plan for Cultural Industry Development” (Ministry of Culture and Tourism, 2021) also emphasizes the creative transformation and innovative development of traditional culture, increasing the digital development and dissemination of traditional cultural resources. For example, it supports traditional cultural enterprises in using new technologies, models, and ideas to upgrade and transform traditional cultural products, enhance their cultural connotations and added value, and improve their international influence. These policies provide a macro-level guiding framework for the digitalization of traditional culture.

Digital art is a highly innovative and expressive form in the field of digitalization. It combines technology and art to show a unique charm. Traditional culture, on the one hand, can provide new forms of expression and dissemination channels. With the help of digital technologies, such as virtual reality and animation, ancient culture can be presented in a more vivid and lively way, attracting the attention of the younger generation, breaking the limitations of time and space, and expanding the scope of dissemination. On the other hand, digital art innovation has stimulated the vitality of traditional culture. By integrating modern elements, we can give traditional culture new connotations and creativity, make it more vibrant in contemporary society, and promote the sustainable inheritance and development of traditional culture. Therefore, digital

art innovation has far-reaching significance and value for the further inheritance of traditional culture.

As one of China's outstanding traditional cultures, the 24 Solar Terms have been actively promoted and publicized by the media since they were listed as world-class intangible cultural heritage in 2016 (China Government Network, 2016). At the same time, they have also become a hot topic in academic research. How to use digital art to empower the cultural innovation of the 24 Solar Terms is a question discussed by many scholars and creators. While the current research covers a multidimensional analysis of digital art related to the Twenty-Four Solar Terms, it still falls short in comparative studies of digital art innovation practices across different regions, particularly lacking in-depth exploration based on the integration of regional cultural characteristics and digital technology. This study categorizes digital innovation works in detail, classifying them from multiple dimensions such as content themes, forms of expression, artistic styles, and application scenarios. By combining the cultural characteristics of the Twenty-Four Solar Terms with digital art techniques, this research provides clear positioning for different types of digital innovation works, thereby supplementing and perfecting the deficiencies in the study of digital art innovation methods.

Research objectives

1. To study the cultural characteristics of the 24 Solar Terms.
2. To analyze the current status of digital artworks with the theme of "24 Solar Terms".
3. To study the digital art innovation methods of Chinese traditional culture and discuss the trend of digital innovation in traditional culture.

Research methods

1. Literature research method: Through various channels, we widely collect books, papers and case materials related to traditional culture and digital

art and classify and analyze them. To obtain research information such as application cases, innovative ideas, successful experiences and existing problems of traditional culture in digital art, combined with the background of the times and technological development trends, provide a theoretical basis and reference basis for the research.

2. Case analysis method: The case analysis method is to conduct in-depth research on specific examples to obtain knowledge and insights. In this study, we collected successful cases of digital art innovation of traditional culture with the focus on “24 Solar Terms”, analyzed these cases in detail, summarized experiences and rules, provided practical references for digital art innovation of traditional culture, clarified feasible paths and potential problems, helped to carry out in-depth research and provided guidance for practical innovation.

3. Interdisciplinary research method: The interdisciplinary research method is to integrate multidisciplinary knowledge to analyze problems comprehensively and in-depth. This study explores the aesthetic value and innovation direction of traditional culture from the perspective of art; analyzes the application of digital technology with the help of computer science theory; and uses communication to analyze the communication strategy of innovative results. By integrating different disciplinary perspectives and methods, a more comprehensive research path is provided for the digital art innovation of traditional culture to promote the development of innovative practice.

The research process is divided into 4 steps: 1) Review the relevant literature on “24 Solar Terms”, “Digitalization of Traditional Culture” and “Digital Art Innovation”; 2) Collect and organize the digital art innovation cases of traditional culture with “Digital Art with 24 Solar Terms Theme” and classify them; 3) Combine literature and theory to analyze various cases and the current status of digital artworks in detail; 4) Summarize the research results, explore how to empower the cultural innovation of the 24 Solar Terms with digital art, and give discussions and suggestions. Based on the above, the conceptual framework of this study is shown in Figure 1

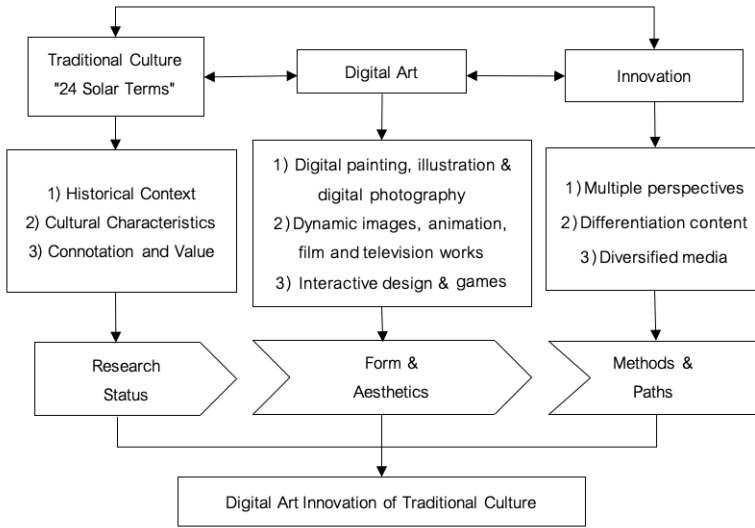


Figure 1 Schematic diagram of the research process

Research results

1. The history, characteristics and current status of the 24 Solar Terms
 - 1.1 The historical development of the 24 Solar Terms

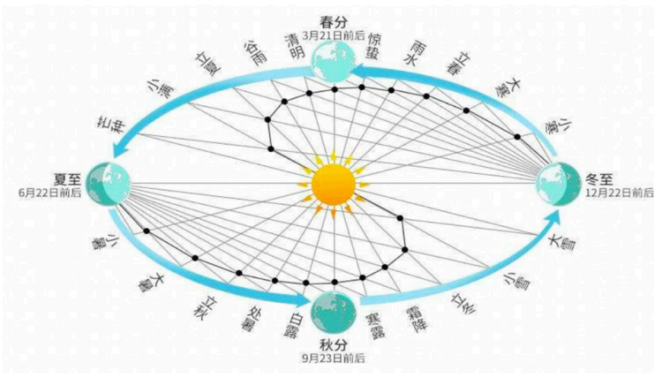


Figure 2 The division of the 24 Solar Terms

According to the research of the 24 Solar Terms Research Center of the China Agricultural Museum, the 24 Solar Terms sprouted in the middle

Neolithic period and went through three stages (Sui, 2022): First, the discovery of the “two equinoxes and two solstices” (Chen, 2021). During the Five Emperors period, the year was determined to be 12 months by observing the Big Dipper, the “Zhuanyu Calendar” was customized and the method of two equinoxes and two solstices was indicated, dividing the orbit of celestial bodies into 24 parts; second, the construction of the “four seasons and eight festivals”. The “Xia Xiaozheng” of the Shang Dynasty recorded meteorological and phenological phenomena. During the Warring States Period, the “Lüshi Chunqiu” and “the Book of Rites” connected the date with the farming season, and the “four seasons and eight festivals” were widely respected; third, the formation of the 24 Solar Terms. The pre-Qin “Yi Zhou Shu · Shi Xun Jie” formed 72 solar terms, and the Western Han Dynasty “Huainanzi · Tianwen Xun” fully recorded the 24 Solar Terms. The “Taichu Calendar” during the Han Wudi period formally determined the complete 24 Solar Terms and corrected the errors of the “Zhuanyu Calendar” (Nanchong Local Chronicles Studio, 2013). Since then, the research on the 24 Solar Terms has continued to deepen and has been used to this day.

1.2 Cultural Characteristics of the 24 Solar Terms

The cultural characteristics of the Twenty-Four Solar Terms are reflected in their naturalness and scientific nature, cultural and philosophical aspects, practicality and guidance, regional and diverse features, heritage and innovation, as well as their ecological and sustainable nature.

Based on natural phenomena, the solar terms reflect changes in seasons, precipitation, and temperature, and have a scientific foundation in astronomy. The terms are rich in cultural connotations; for example, the names “Beginning of Spring” and “Rain Water” poetically express reverence for nature. They are closely linked with folk customs and agricultural activities, embodying the philosophical idea of “unity of heaven and humanity”. The solar terms guide agricultural production, such as “spring sowing, summer growing, autumn harvesting, and winter storing” and influence lifestyles and social activities. The culture of the solar terms varies by region; for instance, the customs of the

Beginning of Spring differ between the south and the north. The culture continues to innovate through inheritance, gaining new vitality with the help of modern technology. Moreover, the culture of the solar terms emphasizes harmonious coexistence between humans and nature, providing wisdom for the construction of ecological civilization (Zhang, 2024). These characteristics make the Twenty-Four Solar Terms an important part of China's excellent traditional culture and hold significant value for modern society.

1.3 Connotation and Value of the 24 Solar Terms

The Twenty-Four Solar Terms are the crystallization of wisdom from ancient Chinese agricultural civilization and a unique temporal knowledge system and social practice of the Chinese nation, encompassing natural, cultural, and social dimensions. They hold significant historical and contemporary value. Not only are they an important carrier of national culture, but they also play a practical role in guiding agricultural activities and traditional Chinese medicine for health preservation. Moreover, they shape people's attitudes towards nature on a moral level and awaken ethical awareness for environmental protection. From an international perspective, the Twenty-Four Solar Terms have had a profound influence on the East Asian cultural sphere. Based on the absorption of China's solar terms culture, Japan has developed its unique system of seventy-two phenological phases (Fan, 2020). Against the backdrop of globalization, the Twenty-Four Solar Terms are not only a symbol of Chinese traditional culture but also an important part of the world's cultural heritage.

1.4 Current Research Status of the Twenty-Four Solar Terms Culture

According to CNKI (China Knowledge Network Document Library), the number of studies on the 24 Solar Terms has increased rapidly since 2016, and the attention has continued to increase (Figure 3), covering history, culture, folklore, agriculture, education and other fields.

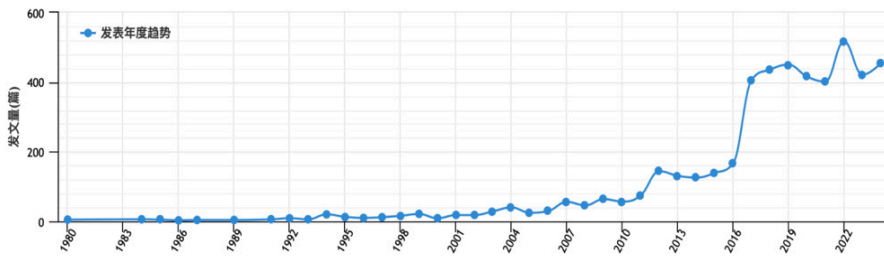


Figure 3 Publication trends of the topic “24 Solar Terms” in the literature collected by CNKI (as of September 2024)

The research from the perspective of the cultural inheritance of the 24 solar terms mainly has three forms: the first is written records, including historical books, origin history, proverbs and ballads, etc. (Ji, 2018), using written records as a carrier to lay a material foundation for cultural interpretation and research; the second is cultural performances and artistic activities, such as academic lectures, performances, paintings, photography, installations, etc. (Luo, 2023), using artistic means to expand the form of inheritance and dissemination; the third is online digitization, including short videos (Jia, 2021), mobile phone wallpapers (Wu, 2023), animated short films, application software APP (Zhang, 2022), etc., using communication media to provide impetus for cultural inheritance and development.

Regarding the innovative communication of the 24 Solar Terms, some researchers have proposed content innovation communication, vigorously developing product communication, industrial development, innovative cultural entertainment and life consumption communication, firmly using new technologies, and giving full play to new media communication from the perspective of communication and economics (Chen, 2025); some scholars have also proposed from the perspective of cultural inheritance that it can be carried out through quality education and ideological and political education, such as conducting intangible cultural heritage research and study activities for community youth to expand the influence of the 24 Solar Terms (Zhang, 2020).






2. Current status of digital art research and creation of the 24 Solar Terms

2.1 Digital painting, illustration, and digital photography

Digital painting and illustration are the creation of static images using digital painting tools. Creators can use digital art brushes with delicate brushstrokes, rich colors and special effects, stylized processing and other functions to give the picture a delicate and dreamy effect. As a common creative tool in the digital media era, digital photography can quickly convert the images captured by the lens into creative materials. Compared with painting, photographic works are more realistic and direct. After secondary creation by image processing software, photographic works can also create more imaginative and dreamy pictures. Digital paintings and digital photography works can be easily disseminated and shared and using them for traditional cultural themes can attract more people to pay attention to traditional culture.

There are a large number of digital paintings, illustrations, and digital photography works on the theme of the 24 Solar Terms. The content of the pictures is mainly natural elements such as plants, animals, and mountains that express the characteristics of climate and phenology, and humanistic scene elements of solar term customs. They tend to be decorative, and the style shows the aesthetic tendency of harmony between man and nature (Liu, 2023). This article selects five representative cases for comparison. These five cases illustrate that in the category of digital images, the 24 Solar Terms can express and convey cultural connotations and aesthetic values from different angles. (Table 1)

Table 1 Comparison of digital paintings, illustrations and digital photography of the 24 Solar Terms

Comparison of works	"Solar Terms in Xinjiang" (Luo, 2023)	"Bilingual Hand- painted 24 solar terms" (Henan Daily, 2023)	Re-creation of the 24 Solar Terms in "The Picture of Farming and Weaving" (Yuan, 2023)	National Museum of Traditional Chinese Medicine 24 Solar Terms Poster (Zhang, 2023)	24 Solar Terms Poster (Chinese Government Website, 2024)
Thumbnail					
content	Folk patterns in Xinjiang and plants and animals of different solar terms	Solar terms customs and scenery in Henan	Elements and scenes corresponding to the solar terms in "The Picture of Farming and Weaving" (1696)	Chinese herbal medicines and land-scapes corresponding to the solar terms	Landscapes and still life corresponding to the solar terms
form	Digital Illustration	Digital Illustration	Digital Illustration	Digital Illustration	Digital Photography
vision style	Pop	Interesting, fresh and natural	Cute, childlike	Fresh and natural	Real and natural
application scenarios	Cultural promotion, brand image	Cultural promotion, social sharing	Book illustrations, art exhibition	Cultural promotion, social sharing, brand image	Cultural promotion, social sharing, brand image

2.2 Dynamic images, animation, and film and television works






Compared with static digital paintings and photography, dynamic images and images have an additional time dimension. Works presented in the form of videos often also contain music elements. The works are larger in size

and richer in content. The audience can receive visual and auditory information at the same time when watching, leaving a deeper impression of the works.

This article selects 5 works with obvious style characteristics for the case comparison: animation videos can be produced in a variety of styles. For example, the “Curiosity Knows the Seasons” (Sui, 2022) series of digital animation works and the representative of popular science animation “Chinese Solar Terms” (Henan Satellite TV, 2023) in the case, the former connects the cultural and tourism landmarks of Xicheng, Beijing with a strong visual style and scattered distribution, and also adds traditional fine brushwork characters and mythological stories, with a unique style; the latter creates a dreamy effect with excellent copywriting and 3D animation special effects, magnificent perspectives and changing lens movements, giving people a strong sense of substitution. As well as the representative works of the live-action documentary variety show “24 Solar Terms Life” (Zhejiang Satellite TV, 2020) and the representative animation work “Solar Terms Elf” (Shandong Solar Terms Family Animation Co., Ltd., 2023), the 24 Solar Terms culture is told in the form of film and television works, filled with rich stories and details, making the audience more intimate with traditional culture. More unique is that Wang Zhiwei (2024) designed a set of 24 Solar Terms dynamic patterns, which used hierarchical analysis and semiotics theory to extract relevant cultural factors and design elements such as phenology, farming, and folk customs, and used AI and image software such as Midjourney to perform secondary creation of patterns, particle production, and music adaptation, and finally created new dynamic patterns, exploring the new possibilities of digital art innovation for the 24 Solar Terms.

It can be seen that in the categories of dynamic images, animations, and film and television works, the 24 Solar Terms culture can be presented in a variety of forms and styles, and artists have a lot of room to play to create unique and novel works. (Table 2)

Table 2 Comparison of dynamic images of the 24 Solar Terms with animations and film and television works

Comparison of works	“Be curious and know the season” (Sui, 2023)	24 Solar Terms Dynamic patterns (Wang, 2024)	season elves (Shandong Solar Terms Family Animation Co., Ltd., 2023)	24 Solar Terms Life (Zhejiang Satellite TV, 2020)	Chinese Solar Terms (Henan TV, 2023)
Thumbnail					
content	Aesthetic presentation of phenological elements corresponding to solar terms	The dynamic effect of particle emission is made of plant-based phenological elements	Telling the story of the 24 Solar Terms culture	Cultural exploration based on the 24 solar terms	Popular science narration of solar terms culture
form	Animation Video	Dynamic Image	TV Animation	documentary variety show	Animation Video
vision style	Fine brushwork collage	Algorithmic Aesthetics	Fairy tales, animation	Real and natural	3D Animation
application scenarios	cultural promotion, art exhibition	cultural promotion, art exhibition	family entertainment, education	Family entertainment, education	family entertainment, education






2.3 Interactive design and games

Compared with the first two categories, in the interactive design and game category, interactivity becomes the core feature of this type of work. Interactive works can interact with the experiencer. When experiencing the work, it not only mobilizes the audience’s visual and auditory organs but also mobilizes the limbs, brain and other organs, so that the work brings the

audience a pleasant or novel experience in the process of interaction, allowing the audience to have a deeper understanding and cognition of the work.

This category of works includes HTML5, mobile apps, games, art installations, VR virtual reality, AR augmented reality, MR mixed reality and other forms. This article selects 5 works of different forms for comparison. It can be seen that the presentation method and effect of the 24 Solar Terms culture on different carriers, different forms correspond to different volumes, different technologies and tools, different experiences and gameplay, so there are different implementation paths in the early preparation stage of creation, the mid-term production stage, and then to the later dissemination and display stage. (Table 3)

Table 3 Comparison of 24 Solar Terms Interactive and Game Works

Comparison of works	"The 24 Solar Terms of Clothing and Food" (Zhang, 2022)	"Strolling along the Central Ax-is" (BLACKBOW× Beijing News, 2023)	Popular Science of the 24 Solar Terms (Bole Technology, 2023)	"24 Solar Terms" (FREE MEN FREE TIME, 2023)	Su Se Lifestyle Hall 24 Solar Terms Exhibition Hall (Suzhou Mu-seum, 2024)
Thumbnail					
content	Learn about the solar terms by matching characters with clothes and food corresponding to the solar terms	Explore the landmarks and cultural stories of Beijing's central axis from the perspective of solar terms digital IP	Place the virtual space of the 24 solar terms into the real space to experience the changing seasons	Gain knowledge and fun of solar terms in game levels	Digital color space created with solar terms dynamic videos and installations.

Comparison of works	"The24 Solar Terms of Clothing and Food" (Zhang, 2022)	"Strolling along the Central Ax-is" (BLACKBOW× Beijing News, 2023)	Popular Science of the 24 Solar Terms (Bole Technology, 2023)	"24 Solar Terms" (FREE MEN FREE TIME, 2023)	Su Se Lifestyle Hall 24 Solar Terms Exhibition Hall (Suzhou Mu-seum, 2024)
form	Interactive Html5	AR interactive works	MR interactive works	game	Art Space
vision style	Cartoon	Fun, natural	Realistic, 3D animation	Interesting, fresh and natural	Algorithmic Aesthetics
application scenarios	Cultural promotion, social shar-ing	cultural promotion, social sharing art exhibition, brand image	science popularization	gaming, education	art exhibition

In general, the number of digital art studies and creations of the 24 Solar Terms is on the rise, and the content is rich and diverse. The three types of digital art exhibit trends in temporal variation, evolving from static to dynamic, from singular to diverse, and from one-way communication to in-depth interactivity. Meanwhile, audience perception has shifted from mere visual appreciation to multi-sensory experiences and emotional resonance. Digital painting, illustration, and digital photography use static images to express natural and humanistic elements, tend to be decorative and embody the harmonious aesthetics of man and nature; dynamic images, animation, and film and television works add time dimensions and music elements, such as animated short videos, film and television animation works, and unique dynamic pattern designs, showing the various forms and styles of the 24 Solar Terms. The interactive design and game development category is focus on interactivity and has many forms. The effects of multi-dimensional fusion can bring richer experiences and immersion to the audience. It can be seen that different carriers have different presentation methods, effects, and implementation paths.

3. Exploring Chinese Traditional Digital Art Innovation Methods and Trends in Traditional Digital Innovation through the Case of the 24 Solar Terms

3.1 Multiple Theoretical Perspectives

Cultural interpretation is closely related to theoretical perspectives. Different theoretical perspectives provide diverse frameworks and methods for cultural interpretation, helping people understand cultural connotations, meanings and values from different dimensions and levels, and are conducive to discovering new phenomena and problems, and promoting cultural innovation and development. In the theoretical research on the 24 Solar Terms, scholar Zhang Bo (2021) found that the 24 solar terms can not only guide agricultural production, but also provide the possibility of getting close to nature and living poetically through the ecological aesthetics they contain; Wang Runzhuo (2020) emphasized the relationship between man and nature, integrating ecological concepts into all aspects of life, pursuing balanced aesthetics, making life orderly and beautiful, and inspiring contemporary life. In addition, the view of the correspondence between heaven and man in traditional Chinese medicine also attaches great importance to the relationship between man and the natural environment. The Yellow Emperor's Classic of Internal Medicine expounds the natural laws of health and the culture of the 24 Solar Terms. The 24 meridians of the human body correspond to the 24 Solar Terms, and the physiological and psychological activities of heaven and earth and man are closely related. The concept of correspondence between heaven and man is the embodiment of the holistic view of the universe in traditional Chinese medicine. It is a bridge between man and the universe, conforming to the unity of heaven and man, thus realizing the organic unity of man and the universe and the internal and external balance. (Huang, 2024)

In the practice of specific projects, images and videos present numerous scenes of natural landscapes, including different forms such as long shots and close-ups. Taking the melting of ice and snow, the sprouting of new shoots on plants, rain scenes and the sound of rain as examples, they can

respectively arouse the audience's perception of the warming weather, vitality and hope, and inner peace. Based on the unity of humans and nature, the creators of digital artworks of the 24 Solar Terms intentionally or unintentionally convey emotions through natural landscapes, thereby highlighting the ecological aesthetic concept of the harmonious coexistence of humans and nature, injecting profound cultural and aesthetic values into the works. This has implications and research significance for the dissemination and development of contemporary ecological culture and also provides typical examples and theoretical entry points for further exploring the relationship between humans and nature in the context of digital art.

3.2 Regional Differentiation Content

With the intensification of urbanization and lifestyle changes, the traditional lifestyle of the 24 Solar Terms has gradually disappeared, resulting in the loss of solar term culture and the lack of audience (Lai, 2017; Zhang, 2016). Regarding the existing problems, many scholars have put forward their views: Although the 24 Solar Terms are a culture shared by the whole country, due to China's vast territory and complex geographical environment, there are also some differences in different regions, forming a unique regional solar term culture (Liu, 2020). Taking the Yangtze River Basin as the boundary, there is a sharp contrast between the north and the south. The climate conditions are quite different, and the temperature differences are obvious, which results in completely different natural and humanistic scenes in the north and south regions during the same solar term. For example, at the Beginning of Winter, the temperature in most parts of the north drops sharply, with biting cold winds, frozen rivers and a vast expanse of white snow, fully demonstrating the scene of a harsh winter. In the south, however, the temperature is mild, the vegetation is lush, the rivers flow smoothly, and people wear light clothes, forming a sharp contrast to the severe cold in the north.

The close connection between the solar terms and regions deeply reflects the diversity of China's climate and natural environment. Therefore, in the process of protecting and inheriting the 24 Solar Terms, we can fully

combine the advantages of regional cultures, so that the solar term culture can better enrich local cultures and be more favored, inherited and innovated by local people. For example, Wu Yuhong (2021) took Zhubei Town, Qingyang, Anhui Province as an example to study the creative design scheme of the 24 Solar Terms culture, put forward the view of combining the local rural landscape with the 24 Solar Terms health culture, and suggested adding VR virtual technology in relevant science museums, increasing dynamic communication in urban public spaces, designing new media products such as APP, etc., so that cultural and creative development can help Zhubei Characteristic Town achieve brand image upgrade and promote the economic development of the town.

3.3 Diversified media

The diversified media of interactive digital art presents rich and diverse forms. Among them, VR and AR technology can create an immersive experience environment, allowing the audience to truly integrate into the context constructed by the artwork; multimedia equipment, including digital display screens, speakers, etc., can effectively present rich and diverse audio-visual content; the application of the Internet realizes the online dissemination of artworks, and the audience can participate in the interaction remotely, breaking through the limitations of time and space; sensors and interactive devices can accurately capture the audience's actions and reactions, thereby realizing real-time interaction; in addition, the combination of interactive digital art and traditional media such as painting and sculpture can further expand the boundaries of artistic expression.

However, the use of diversified media in interactive digital art also faces numerous challenges. Technically, VR and AR devices are costly and may cause dizziness, sensors are prone to interference, and multimedia devices have compatibility issues. All these factors limit the popularization of the technology and its application effects. In terms of audience accessibility, the poor network infrastructure in remote areas affects online dissemination, making it impossible for some audiences to interact remotely. Moreover, complex interactive technologies require audiences to possess certain digital literacy and operational

skills, which creates a participation barrier for the elderly and those with a low level of education, restricting the audience range and hindering its wide dissemination and in-depth development. Therefore, efforts should be made in aspects such as technology optimization and audience popularization education to break through these obstacles and promote the better development of interactive digital art with the help of diversified media.

Conclusion

Based on the above research results and discussions, the researchers came to the following conclusions:

1. The 24 Solar Terms have the following cultural characteristics: reflecting the natural rhythm and reflecting the ancient people's observation and understanding of nature; guiding agricultural production and providing a basis for agricultural activities; containing philosophical ideas such as yin-yang balance and the unity of man and nature; deriving rich folk culture and inheriting traditional culture; it is also a source of inspiration for poetry and art, leaving behind many works of high artistic value and enriching its cultural connotation.

2. The current status of the creation and research of digital artworks of the 24 Solar Terms is: that since 2016, the number of works and research has increased rapidly, and the content is diverse. There are mainly three types: digital painting and illustration, photography; dynamic images and film and television works; interactive design and game development. Different types of works have different presentation methods, effects and implementation technologies, which bring rich experiences to the audience.

3. The innovation methods of digital art of the 24 Solar Terms are: different theoretical perspectives provide diverse frameworks to help cultural interpretation and innovation; regional differentiation can combine local cultural advantages to inherit and innovate; diversified media such as VR, AR, multimedia, etc. present rich forms and expand the boundaries of artistic expression.

Discussion

The culture of the 24 Solar Terms encompasses multidimensional characteristics such as natural philosophy, agricultural practice, and folk art. Its digital art innovations have shown a triple evolution of “medium-narrative-interaction” from static painting to dynamic generative art, from singular cultural symbols to transmedia storytelling, and from one-way communication to immersive interactivity. In terms of audience perception, enhancing cultural identification through multisensory design is a trend (Wang, 2024).

Compared to previous research, this study expands in several ways. While prior studies focused on the historical and cultural value and traditional inheritance of the Twenty-Four Solar Terms, this research further explores the application of digital art innovation in cultural heritage protection, especially through VR and AR technologies, aligning with Chen Hua (2025).

From both theoretical and practical perspectives, this study provides specific strategies and suggestions for using digital art to protect and inherit cultural heritage by comparing the content, form, style, and application scenarios of different types of digital art works.

However, applying digital innovation to cultural heritage protection also faces many challenges and limitations. Technologically, VR and AR devices are expensive and have compatibility issues and limitations in user experience (Wei, 2025). In terms of audience accessibility, poor network infrastructure in remote areas restricts the dissemination of digital art works. Additionally, the complex technical requirements also set high demands for the digital literacy of creators and audiences, which to some extent limits the popularization and application of digital art works

suggestions

1. Technology Application: Actively integrate technologies such as VR, AR, and MR into the digital art creation of the 24 Solar Terms. For example,

precisely restore ancient scenes and utilize interactive projections to enhance users' sense of participation. Develop platforms that are compatible with multiple mobile devices. Through image compression and cache technologies, ensure their smooth operation and rapid loading, bringing users a convenient and immersive cultural experience of the solar terms, laying a solid technological foundation for the development of digital art and facilitating cultural dissemination.

2. Education: Invite experts in culture, history, education and other fields to conduct a comprehensive interpretation of the solar term culture and develop multi-level digital education resources to integrate into the works. Meanwhile, popularize digital literacy and cultural aesthetic education in both school and social education, deepen the public's recognition and understanding of the solar term culture, promote the coordinated development of digital art and education, and achieve cultural inheritance and innovation.

3. Community: Build a digital art community platform for the solar terms, which covers functions such as sharing, communication and activities, strengthen social interaction, and regularly hold online and offline activities to create an active atmosphere. Set up an incentive mechanism to reward active participants, encourage the public to jointly create, gather collective wisdom, enhance cultural influence, and promote the inheritance and development of community culture.

4. Inheritance: Digitally collect, classify and sort out the cultural materials related to the solar terms, construct a database and standardize copyright management. Vigorously advocate the creative concept that combines inheritance and innovation. With the help of academic seminars, creative forums and other activities, guide creators to use modern technologies to display the essence of traditional culture, stimulate new vitality of the solar term culture, and ensure its inheritance and innovation in the digital age.

5. Market Promotion: For the digital art of the 24 Solar Terms, it is necessary to segment the needs according to the differences among the audience and develop diverse derivatives such as cultural and creative products to broaden the profit channels. Comprehensively utilize marketing means such as social media, cultural exhibitions, and online advertisements to make the solar term culture thrive in the market and create cultural and economic values.

References

- Chen, W. (2021). Solar terms in the ancient world. **Chinese Science and Technology Education** (02), 76-77.
- Chen, H. (2025). Empowering the Dissemination of Fine Traditional Chinese Culture with Digital Technology. **China Cyberspace** (02), 81-82. doi:CNKI:SUN:WLCB.0.2025-02-020
- China Government Network. (2011). **Order of the President of the People's Republic of China No.42**. Retrieved from https://www.gov.cn/flfg/2011-02/25/content_1857449.htm.
- China Government Network. (2016). **The 24 Solar Terms were selected into the World Intangible Cultural Heritage List**. Retrieved from https://www.gov.cn/xinwen/2016-12/01/content_5140793.htm.
- China Intangible Cultural Heritage Network. (2016). **"24 Solar Terms" is officially included in the UNESCO Representative List of Intangible Cultural Heritage of Humanity**. Retrieved from <https://www.ihchina.cn/art/detail/id/8992.html>.
- Fan, W. (2020). **A Study on Japan's Twenty-Four Solar Terms and Its "Zaseki" Culture**. In Chinese Agricultural Museum (eds.), Proceedings of the International Academic Symposium on the Twenty-Four Solar Terms. (pp.418-430). China Agriculture Press.
- Huang, X. (2024). A brief analysis of the possibility of visual innovation in the 24 solar terms based on the concept of correspondence between heaven and man. **Popular Literature and Art** (09), 51-53. doi:10.20112/j.cnki.ISSN1007-5828.2024.09.017.
- Ji, Z. (2018). Looking at the living inheritance of the 24 Solar Terms from solar terms songs and proverbs. **Journal of Nanjing Normal University (Social Science Edition)** (02), 54-59.
- Jia, H. (2021). Strengthening connection rituals and guiding multiple combinations - Discussion of communication methods brought about by the Douyin topic "Singing the 24 Solar Terms". **Northern Media Research** (03), 54-59.

- Lai, G. (2018). **Romance of the 24 Solar Terms**. Guangxi: Guangxi Normal University Press
- Liu, M. (2023). A comparative study of illustrations and their cultural and creative products: A case study of the 24 Solar Terms. **Art Literature** (03), 108-110. doi: 10.16585/j.cnki.mswx.2023.03.021.
- Liu, J. (2020). **Research on thematic narrative product visual design based on the 24 Solar Terms and regional cultural symbols**. (eds.) Proceedings of the 24 Solar Terms. International Academic Symposium, 566-577.
- Local Chronicle of Nanchong City office (20213). **Nanchong City Local Chronicles**. Local Chronicle Press.
- Luo, Y. (2023). **Illustration design and creation research on “Solar Terms in Xinjiang” from the perspective of culturally nourishing Xinjiang**, Xinjiang: Xinjiang University of the Arts.
- Ministry of Culture and Tourism of the People’s Republic of China. (2021). **“The 14th Five-Year Plan for Cultural Industry Development”**. Retrieved from https://zwgk.mct.gov.cn/zfxxgkml/zcfg/zcjd/202106/t20210607_925031.html
- Sui, B. (2022). The historical context of the 24 Solar Terms. **Ancient and Modern Agriculture** (01), 1-9.
- Wang, R. (2020). **Research on the 24 Solar Terms from the Perspective of Ecological Aesthetics**. (eds.) Proceedings of the International Academic Symposium on the 24 Solar Terms, 389-401.
- Wang, Z., Long, J. & Wu, Q. (2024). Design research based on hierarchical analysis and cultural genes of dynamic patterns of the 24 Solar Terms. **Packaging Engineering** (12), 414-424. doi:10. 19554/j.cnki.1001-3563.2024.12.041.
- Wu, M. (2023). **“Alternative” regional expression of the beauty of solar terms**. China Press, Publication, Radio and Television, 007.

- Wu Y. (2021). Research on the design of cultural and creative products of the 24 Solar Terms under the background of rural revitalization - Taking Zhubei Town, Qingyang, Anhui as an example. **Journal of Wanxi University** (02), 107-112. doi: CNKI:SUN:WXXB.0.2021-02-022.
- Xinhua News Agency. (2017). **The General Office of the CPC Central Committee and the General Office of the State Council issued the “Opinions on Implementing the Project of Inheriting and Developing China ’s Excellent Traditional Culture”** https://www.gov.cn/zhengce/2017-01/25/content_5163472.htm
- Zhang, B. (2016). **The cultural implications of the 24 Solar Terms**. Guangming Daily, 02
- Zhang, B. (2021). **Researcher Zhang Bo talks about the contemporary value and protection and inheritance of the 24 Solar Terms culture**. Retrieved from https://www.cas.buu.edu.cn/art/2021/12/15/art_20708_660484.html
- Zhang, J., Qi, P. & Hu, Q. (2024). The Temporal View and Ecological Civilization Wisdom Contained in China's Twenty-Four Solar Terms. **Yuejiang Academic Journal** (01),163-170.doi:10.13878/j.cnki.yjxk.20231208.001.
- Zhang, Q. (2022). **Visual design application of the 24 Solar Terms**. Qingdao: Qingdao University.
- Zhang, W. (2020). **Research on innovative methods of inheritance and dissemination of the 24 Solar Terms - Taking the intangible cultural heritage research of community teenagers as an example**. (eds.) Proceedings of the International Academic Symposium on the 24 Solar Terms, 599-606.
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