Research Article

Research on Digital Display of Nonlinear System Model of Tea Drinking Space in the Song Dynasty Based on Neural Network Technology

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Tea is the national drink of the Chinese nation. It combines the thoughts of various Chinese schools and has experienced the changes and baptism of successive dynasties and has been spread to this day. It is difficult to achieve the inheritance of tea culture by relying on ordinary display methods. In order to better display the digital effect of the nonlinear system model of the tea space in the Song Dynasty, using digital display, we can design the layout of the tea space in the Song Dynasty through video, audio, and dynamic pictures, which plays an important role in the inheritance of tea culture. This study analyzes the tea drinking space and tea culture and spreads the historical and cultural value of digital display; by comparing the comprehensive performance analysis and cultural extension results under different displays, as well as the desire for knowledge of history and culture, we can make an in-depth exploration. Through the statistical data information, we can conclude that under the function of digital technology, advanced science and technology and digital technology have a good effect in cultural inheritance, they can better promote the spirit of history and culture, and make the torch of history and culture live and pass on from generation to generation.

1. Introduction

Tea space culture is an important part of tea culture. Ancient literati have been pursuing elegant and simple slow life, and tea drinking space is an important place to show the pursuit of elegance by literati. The Song Dynasty, which is famous for its elegant literature and art, is particularly outstanding in the tea space culture. Its quiet and elegant tea space culture is worth reading by future generations. However, nowadays, museums mostly use traditional display methods to display the tea drinking space of the Song Dynasty. The order of its methods seriously limits the free play of the thinking nature of the human brain and cannot let the audience feel the unique charm of the tea drinking space of the Song Dynasty in an all-round and three-dimensional way. The traditional way of exhibition can no longer meet the requirements of current cultural publicity, so a new way needs to be adopted

to display and publicize the tea space culture of the Song Dynasty.

The arrival of the era of artificial intelligence has broadened the new ideas of cultural propaganda, and the digital display of the nonlinear system model of the Song Dynasty tea drinking space based on neural network technology has entered the public's attention. Wang and Li and others believe that neural network technology is a dynamic system that processes the state information of continuous or intermittent inputs and takes the directed graph as the topological structure [1]. Bao and others indicate that this technology has the advantages of high nonlinearity, self-adaptive and self-learning habits, parallel distributed processing, and fault tolerance [2]. Jiang said that artificial neural network (ANN) is the key technology of intelligent control. Through the integration of artificial thinking and intelligent manipulation framework, neural network can

ensure the specific integration of data information with neurons as nodes in cyberspace, and the weight value between related neurons is no longer limited to the fixed data transmission framework, so as to make the realization of relevant data functions more accurate and meet the needs of intelligent control [3].

Neural network technology provides a strong support for nonlinear systems. Huang et al. and others said that artificial neural network is a machine learning model with strong mapping ability to nonlinear systems [4]. Zhang et al. said that artificial neural network is a highly nonlinear intelligent information processing system with adaptive learning characteristics. Neural network can flexibly and accurately solve multivariable nonlinear system problems by using a large amount of data [5]. Chen said that the deep neural network can be used to fit complex nonlinear systems with sufficient learning data [6]. Wang also expressed the same view that neural network is helpful to solve the control problems of uncertain and nonlinear systems [7]. Liu et al. and others said that neural networks have the characteristics of good convergence of complex nonlinear systems and can spontaneously organize, learn, and process [8]. Liu said that using neural networks to control nonlinear systems has become an important topic in the industry [9].

Digital exhibition is the inevitable choice of museums under the current development of science and technology. Wang believes that in the current era, using digital new media technology to display culture is a kind of cultural innovation. Integrating digital technology into the design of cultural exhibition space enriches the cultural connotation and diversity of intangible cultural heritage exhibition space and is also more conducive to the inheritance and development of China's intangible cultural heritage [10]. Yin expressed the same positive view that digital technology has opened up a new path for cultural exchange, and its immersive and interactive way has promoted the inheritance and development of culture [11]. The digital display of the nonlinear system model of the Song Dynasty tea space based on neural network technology is more suitable for the thinking mode of the human brain. It can break the traditional law of displaying linear narration, touch different sensory organs, help the audience perceive the tea space culture of the Song Dynasty through multiple channels, enrich the cultural experience of the audience, can deepen the audience's perception and understanding of the Song Dynasty tea space culture, and can better help the audience experience and explore the civilization of the Chinese tea culture.

This paper mainly studies the digital display of the nonlinear system model of the Song Dynasty tea space under the neural network technology, aiming to explore the advantages of the digital display of the Song Dynasty tea space through this research and make contributions to the promotion of the Song Dynasty tea space culture.

2. Value and Significance of Tea Space Culture in the Song Dynasty

The culture of tea drinking space in the Song Dynasty was fully popularized, and the types of tea art activities were more abundant, which promoted the diversified development of tea drinking forms, tea sets, and the corresponding tea drinking space. Tea drinking space has a common pursuit of physical environment and artistic conception, mainly focusing on material space. Tea art space is only the carrier of tea art activities. Based on neural network technology, we can analyze the tea drinking space of the Song Dynasty from a nonlinear system model. If you want to understand the tea drinking space of the Song Dynasty, you should base on the behavior subject and feel the tea culture experience of the Song Dynasty under the support of digital technology. The application of exhibition space should meet the space conditions and interactive needs, create personalized creative space, coordinate the design of tea space, and promote the inheritance and popularization of traditional tea culture.

Digital display has become a new carrier for the dissemination of tea culture, which can expand visitors' vision of tea culture cognition and improve visitors' humanistic quality. The animated images presented by dynamic video images, combined with the layout and display of tea space, bring visitors novel and unique experience, explore the tea culture of the Song Dynasty from a unique perspective, and present the tea customs of the Song Dynasty with the best picture display. The dynamic scene can enrich the humanistic connotation of visitors. The digital display of nonlinear system model allows visitors to have a deeper and detailed understanding, which is conducive to the spread of cultural spirit and improves the value of traditional culture.

The display of tea space in the Song Dynasty has changed the original static state, and the details cannot be understood. Dynamic digital display can better observe and experience the relevance of tea culture and tea space. Through the nonlinear system model to convey folk culture information, feel the charm and magic of traditional culture, so as to obtain psychological comfort. In the design of tea space, the inherent humanistic and historical landscape can be created and designed. The technical support of neural network can better interpret the cultural connotation. The digital display of tea space in the Song Dynasty can also cultivate the aesthetic emotion of visitors, stimulate the interest in tea space design and tea culture, and also reflect the artistic charm of tea culture. The Song Dynasty is an important period of development and prosperity of Chinese tea culture. Its culture has distinctive artistic characteristics and rich cultural connotation and heritage.

In the process of the development and impact of Internet culture, the digital display of tea drinking space in the Song Dynasty, mastering relevant historical knowledge in the whole display expression, can see the profound connotation and value influence of culture. People in the Song Dynasty

love tea very much, which can cultivate their sentiment, improve themselves, and cultivate their personality. Visitors get peace of mind from the display, bring enjoyment, and meet their psychological needs. The core value of tea culture is to improve cultural quality, attach importance to noble personality, and perfect self-spiritual character. After thousands of years of precipitation, tea culture has a special significance in today's society to appreciate the culture of tea and the cultural value and connotation of tea itself and pay attention to the development of spiritual level.

3. Digital Display of Nonlinear System Model Based on Neural Network Technology

Museum is an important symbol of the development of national civilization, which bears the function of "education and dissemination". However, the traditional display mode of the museum is sequential and linear, and its information carrier is only the display object and static explanatory text (the explanatory text is also orderly and linear), which leads to the limitation of the play of the thinking nature of the human brain (the thinking nature of the human brain has the characteristics of nonlinearity, jumping, and dispersion). This straight-line and lack of change display are not conducive to deepening the audience's understanding of the cultural relics displayed. Especially when the intangible cultural heritage such as the Song Dynasty tea space culture is displayed, the publicity and communication function of the traditional display method is even more insufficient. The audience can only watch in order, according to the predetermined route of the museum, and most of them can only look at the flowers at a glance, which makes it difficult to have a deep understanding of the connotation and charm of the tea space culture of the Song Dynasty.

The digital display of nonlinear system model based on neural network technology is more in line with the requirements of cultural publicity and dissemination in today's era. Digital display has the characteristics of nonsequencing, which enriches the display technology and means, breaks the law of traditional display linear narration, solves the problem that only a single display means can display a single information, and allows the audience to understand the information of tea space culture in the Song Dynasty from multiple perspectives.

When displaying the tea space of the Song Dynasty, combining physical exhibits with digital technology can enhance the education and communication role of physical museums. Digital display can touch the audience's various sensory organs through text, image, video, animation, sound, and other ways and help the audience perceive the information of the Song Dynasty tea space culture from various sensory channels, so that the audience can feel the unique charm of the Song Dynasty tea space culture in an all-round and three-dimensional way, so as to obtain a complete, vivid, and systematic understanding of the Song Dynasty tea space culture. At the same time, digital display is more interactive. In traditional exhibitions, the flow of information is one-way, and the audience can only passively accept information. In the digital display, the text information is more dynamic and open, and the audience has the right to choose freely. They can process and transform the tea space according to their own wishes, which makes the visit more fun. In this way, the audience's participation will be higher and their interest will increase. At the same time, digital display is also virtual. In the digital display of the virtual Song Dynasty tea space scene, the audience can use external technical means to carry out activities in the virtual scene and can observe the layout of the Song Dynasty tea space without restrictions, which make the audience feel more immersed and dynamic. This further enhanced the audience's interest and impression of the Song Dynasty tea space culture. Digital exhibition emphasizes that the audience is the core of the exhibition, which not only strengthens the interaction between people and exhibits but also strengthens the interaction between people and the outside world. In this atmosphere of education and appreciation, the audience is more enthusiastic, more involved, more impressed, and the display effect is better.

The digital display of nonlinear system model based on neural network technology can better show the concept of "people-oriented". It transforms boring words into images, videos, animations, sounds, and other forms, providing the audience with a comprehensive perception experience. The single information transmission is transformed into experience activities, which shortens the distance between the audience and history and culture. The audience not only obtains the fun of participation but also obtains a systematic and profound understanding of the tea space culture of the Song Dynasty.

4. Simulation Verification

4.1. Performance Analysis of Two Displays of the Song Dynasty Tea Space Model. The interactive demand of tea space for human environment and spatial environment and the clear level of tea space and the role of spatial cultural atmosphere make tea space more expressive, infectious, and tensile. During the exhibition, the dimensions of space and time have been expanded unprecedentedly. The all-round exhibition can allow visitors to observe parts and details. Under the multimedia technology, they can perceive the information of the Song Dynasty tea space model from a variety of sensory channels, so as to obtain a more complete, profound, and systematic understanding. Now, the performance of two different displays is analyzed, and the following Table 1 is obtained:

Table 1 shows the performance comparison results of the two displays of the Song Dynasty tea space model. From the data results, the digital display in terms of multisensibility and space-time scalability is due to the ordinary display effect, and finally realizes the good interaction between visitors and tea culture.

According to the performance analysis results in the above table, the following Figure 1 is obtained:

As shown in Figure 1, the comprehensive performance visualization effect of the two displays is shown, and the gap between the two can be clearly seen. The performance of

TABLE 1: Performance analysis of two displays (%).

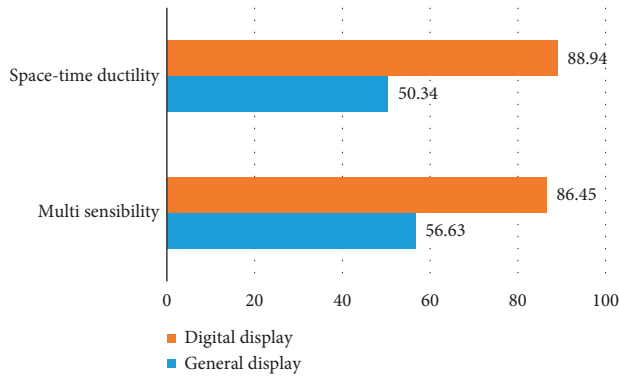| Group	Multisensibility	Space-time ductility
General display	56.63	50.34
Digital display	86.45	88.94

FIGURE 1: Performance visualization of two displays (%).

digital display is better, which can expand its influence and bring the best visiting effect to visitors without time, space, and other constraints.

4.2. Comparison of Two Display Effects. Digital display can express the needs of the Song Dynasty tea space for the humanistic environment and spatial environment. The tea space meets the needs of aesthetic appreciation and knowledge culture. In the layout of the tea space, we emphasize the culture, especially the tea culture, deeply excavate the spiritual resources of excellent traditional culture, and pay more attention to the extension of cultural values. As a very common spiritual demand, aesthetic appreciation fully enjoys this appreciation and aesthetic feeling in the tea space. Now for the spatial effects of tea drinking in the Song Dynasty under two different displays, the following Table 2 is obtained:

Table 2 shows the comparative effect of tea drinking space in the Song Dynasty under the two displays. There is a statistical significance of $t < 10.000$, $p < 0.05$ when comparing the data. Digital display, with its unique display effect and beautiful scientific and technological means, makes the way for visitors to acquire knowledge more active and has made a certain contribution to the dissemination and inheritance of tea culture.

According to the comparison effect in the above table, the following Figure 2 is obtained:

As shown in Figure 2, it shows the visual effect of the comparison of the two kinds of tea drinking spaces in the Song Dynasty. It can be clearly seen that the digitally displayed tea drinking space in the Song Dynasty is conducive to the aesthetic appreciation ability of visitors and the extension of traditional cultural values. In addition, it is of great significance to promote the spirit of tea culture.

4.3. Influence of Tea Culture Transmission under Two Kinds of Exhibitions. Tea culture has a wide range of communication channels, and ordinary exhibitions lack interaction, and there are no more opportunities to explore new knowledge. Digital tea space exhibition can enable visitors to have a deeper perception and understanding of tea culture. In addition, with the support of computer technology, digital exhibition can create a vivid tea culture atmosphere, bring visitors unique feelings, and the cost of the exhibition is lower than ordinary exhibitions. Digital display only increases the production cost of digitalization, which is significantly lower than that of other exhibitions. The display of digital tea space highlights a strong flavor of tea culture. Table 3 is made for the dissemination of tea culture under two different displays:

Table 3 shows the comparison results of the cultural spirit transmission of tea culture under the two displays: the audience's thirst for knowledge of tea culture and the exhibition cost. It can be seen visually that digital display has a positive significance for the transmission of tea culture. The effect of digital display can not only enrich the knowledge level of visitors but also improve the spiritual and cultural connotation.

According to the comparison information in the above table, the following Figures 3 and 4 are obtained:

As shown in Figure 3, the visualization effects of the two displays on the dissemination of cultural spirit and the audience's thirst for knowledge of tea culture can be clearly seen. The contrast gap between the two sets of data can be clearly seen. The digital display of the nonlinear system model of tea drinking space in the Song Dynasty promotes the effective dissemination of traditional cultural spirit, and its cultural spirit connotation can be perfectly presented in tea culture.

As shown in Figure 4, the cost comparison visualization effect of the two displays is shown. The general display of tea space in the Song Dynasty is significantly higher than the digital display in terms of exhibition cost, which can indirectly explain that the digital display has improved the new ideas for other traditional cultures.

4.4. 4 Comparison of Visitors' Interest and Satisfaction under the Two Displays. Digital tea space display is more and more inclined to visitors. Based on neural network technology, the digital display of the nonlinear system model of tea space in the Song Dynasty can be transformed into a harmonious and interactive relationship. Visitors can change their previous passive position, actively participate in the activities of digital display, and learn knowledge through experience. Digital display breaks the traditional restrictions of time and space. A good interactive platform has been established for viewers and tea space display to improve visitors' interest and satisfaction. Now, we investigate the interest and satisfaction of visitors under two different displays and make charts according to the results and get the following Table 4:

In Table 4, the interest and satisfaction of visitors under the display of the two Song Dynasty tea drinking spaces are counted. From the table, it can be found that under the

TABLE 2: Two kinds of tea space effects in the Song Dynasty (%).

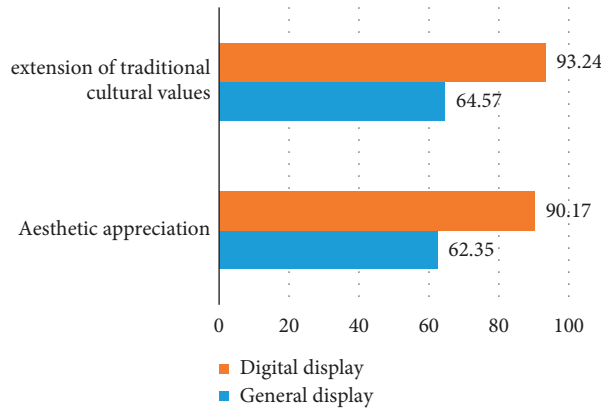| Group	Aesthetic appreciation	Extension of traditional cultural values
General display	62.35	64.57
Digital display	90.17	93.24
T	6.348	6.242
P	0.038	0.037

FIGURE 2: Comparison and visualization of two kinds of tea drinking spaces in the Song Dynasty (%).

TABLE 3: Analysis of tea culture transmission under two displays (%).

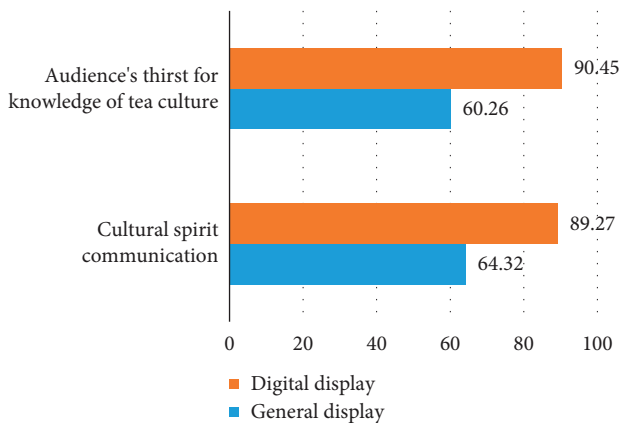| Group	Cultural spirit communication	Audience's thirst for knowledge of tea culture	Exhibition cost
General display	64.32	60.26	76.43
Digital display	89.27	90.45	48.61

FIGURE 3: Comparison of the two displays on the dissemination of cultural spirit and the audience's thirst for knowledge of tea culture (%).
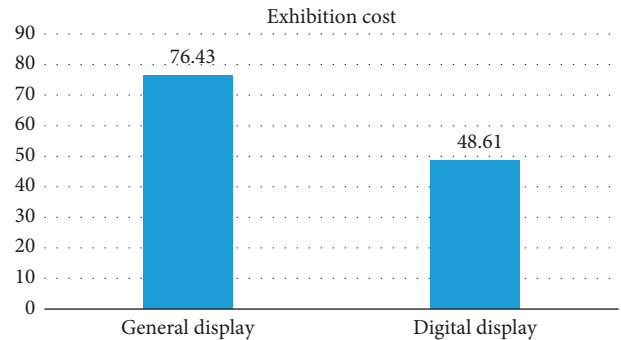

FIGURE 4: Cost comparison of two displays (%).

digital display, the interest and satisfaction of visitors can be improved. It indirectly shows that digital display has fascinating mysterious charm.

According to the statistical information in the above table, the following Figure 5 is obtained:

As shown in Figure 5, the visualization effects of visitors' interest and satisfaction in the two kinds of displays are shown, and the contrast gap between the two groups of data can be clearly seen. The impact of digital display on the display of tea space in the Song Dynasty is very obvious, mobilizing visitors' strong interest in the display of tea space, and significantly improving their satisfaction in the display effect.

5. Discussion

The emergence of digital media represented by the Internet has provided a new channel for the cultural publicity of museums and exhibition halls. Through the digital processing of the Song Dynasty tea space culture, it helps to

Table 4: Analysis of interest and satisfaction of the two displays (%).

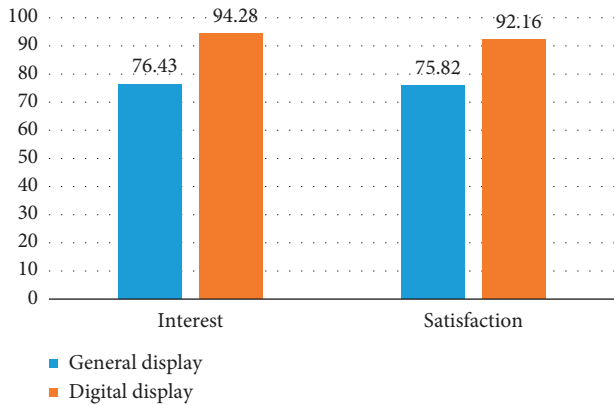| Group	Interest	Satisfaction
General display	76.43	75.82
Digital display	94.28	92.16

Figure 5: Visualization of interest and satisfaction of two displays (%).

deepen the audience's understanding of the Song Dynasty tea space culture and also creates a new reading and interpretation space for the Song Dynasty tea space culture. Yang Xiaoxue (2022) believes that it is necessary to integrate digital technology into museum work. In the process of cultural relics display and dissemination in the museum, using digital technology to innovate the form of display and dissemination can bring people a better viewing experience [12]. Wei Ming (2021) said that through the integration of multimedia technology, the combination of dynamic and static, virtual and real response, and the use of digital display technologies such as pictures and words, physical display, historical images, scene restoration, and virtual reality, it can well interpret the charm value of traditional culture, so that visitors can see the big from the small and explore the whole from the small while watching the exhibition [13].

In this study, we studied the digital display of the nonlinear system model of the Song Dynasty tea space based on neural network technology, through dynamic interactive experience to appreciate the traditional culture, in which the tea space culture has rich artistic connotation and embodies the aesthetic value. The effective integration of tea space design and tea culture can be verified by the digital display of nonlinear system model. No matter from all levels, the design of tea space reflects different cultural connotations and also creates a unique cultural artistic conception. The design of tea space in the Song Dynasty is personalized, and tea culture also has a strong moral and cultural color, which can highlight natural and quiet ideas from digital display. The digital display of the nonlinear system model of the Song Dynasty tea space based on neural network technology directly reflects the characteristics of the psychological spirit.

The application of multimedia makes the digital display process not only a spiritual experience but also has strong aesthetic appreciation ability, which makes the tea space design have a cultural flavor, integrates the tea culture concept of the Song Dynasty into the tea space design, and then improves the overall design level of tea drinking space.

6. Summary

The Song Dynasty was the heyday of the development of China's tea culture. The social customs of drinking and advocating tea promoted the development of tea culture. Today, with the rapid development of digitalization, digital display has gone deep into various fields and industries. Compared with ordinary display methods, this study uses the nonlinear system model of neural network technology, and the digital display of tea space in the Song Dynasty has more sensibility and space-time ductility, enhances visitors' ability to improve aesthetic appreciation, expands the tea culture that shows the tea drinking space, and better extends the traditional cultural value. Digital display can save the cost of human and material resources of the whole exhibition and play a good role in promoting the spread of the cultural spirit of tea culture and the audience's thirst for knowledge of tea culture. In the process of exhibition, it will bring new feelings to visitors and enhance their interest and satisfaction. The precipitation of thousands of years of history and culture, with the help of the power of new media, better understands the connotation and essence of tea culture and provides new ways and possibilities for the dissemination and inheritance of tea culture.

Data Availability

The data underlying the results presented in the study are available within the manuscript.

Conflicts of Interest

The authors confirm that there are no conflicts of interest.

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