

Research Article

Analysis on the Three-Dimensional Intervention Mode of Public Art in Rural Culture from the Perspective of 3D Video

Xiang Li and Hang Liu 

Art College of Southwest, Minzu University, Chengdu, Sichuan 610225, China

Correspondence should be addressed to Hang Liu; 21300175@swun.edu.cn

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With the development of 3D technology, based on the perspective of 3D video, this paper analyzes the principle of 3D video, establishes the perspective model of 3D video, and discusses the modeling process in detail. Then, from the perspective of 3D video, this paper studies the three-dimensional intervention model of public art in Beijing, Shanghai, Chongqing, and Tianjin. Through the combination of public art and rural culture, the countryside can obtain vitality through art and popularize and promote rural culture and image. In general, this paper provides some ideas and experience for the research of public art in rural culture from the perspective of 3D video.

1. Introduction

Public art is also known as social art. It does not belong to a certain kind of art genre or art style, nor does it only refer to a certain kind of art form. It refers to the art created by any media in public space, which is usually located outdoors and open to the public and meets the three characteristics of publicity, popularity, and artistry at the same time [1]. In terms of form, public art includes sculptures, murals, gardening, decoration, landscape, and public spaces (squares, buildings, roads, urban roads, etc.). Meanwhile, the public art also includes some artistic activities such as celebrations and public performances. These public arts existing in public spaces serve the public and embody the spirit and value of cultural openness, sharing, and exchange in public spaces [2]. Public art refers to works or designs created by artists for a given special public space. Based on this, we understand that public art is a very broad artistic abstract concept, and there is no specific definition of art types. But what is certain is that public art exists in society or public space and has an impact on the broad public and society, which is also an artificially created behavior or art [3, 4].

Generally speaking, in the 1930s, public art emerged in the United States during the great depression. At that time,

with the help of the new deal implemented by the government, public art entered the social public space and people's daily life space one after another [5]. It was intended to alleviate people's pain caused by the economic crisis and cultivate the pride of American culture through public art. After that, the function of public art has gradually developed from simplification to diversification. Public artworks in cities no longer only have aesthetic functions but also have new functions such as activating space, promoting interaction, and harmonious society [6].

In China, the public's awareness of public art is not enough and even mistakenly believes that it is an independent art type or style. Of course, there are not many behaviors with clear public art characteristics in the real sense in China [7]. In terms of regions, public art appeared earlier in economically developed areas, earlier and more in cities than in villages, and later and less in villages because of the large development gap between them and cities.

The development of rural public art is mainly concentrated in rural residential spaces, individual scenic spots, scenic spots, and other spatial places after entering the twenty-first century [8, 9]. Another way of presentation is in pure artistic forms, such as the current various artist villages and rural art seasons. All kinds of artists concentrate on rural

areas for creation, and most of the works of art are displayed outdoors. Of course, the scale is usually larger than indoor, is more intuitive, and has strong interaction with culture, nature, and environment [10].

In terms of space design, since the twenty-first century, a series of architectural art villages have emerged in China [11]. Most of these activities are organized by social forces, and some well-known architect teams at home and abroad go to a fixed rural area for free design, creation, and construction, with the nature of the architectural experiment. These architectural experiments in the countryside have gone beyond the scope of architecture and have formed a strong touch and guidance to the rural architectural culture and traditional culture, especially enlightening the generally chaotic and low architectural cognition in the countryside [12]. The most direct effect is that the surrounding area of the experimental area benefits directly. Due to the social effect of architects, the society pays attention to the area, which has greatly improved its popularity and tourism attraction. The sudden increase in the flow of people has directly increased the local development opportunities.

These experimental behaviors of space design in rural areas are more of the nature of public art. They are more professional in space design, interact more with the public and society, and use professional exploration to greatly affect society and their professional fields. Since they are experimental, they have more reliance on art so that more people pay attention to architectural art and feel the charm of architectural art [13, 14].

With the promotion of the National Rural Revitalization Strategy, new rural construction, and rural poverty alleviation, rural public art practice projects have developed rapidly in China, but there are also many problems with the booming development trend [15, 16].

1.1. Ignoring the Subjective Status of Villagers, It Is Difficult to Realize the Effective Upgrading of Industry. Many artists lack research on the actual situation in rural areas [17]. They ignore the subjectivity of villagers and the living state and spiritual world of local residents. They imagine the rural environment as an ideal Utopia or simply take it as another display space and simply move the works originally placed in the art museum to the rural environment so that the works are incompatible with the rural environment and cannot resonate between villagers and viewers. Therefore, it is unable to achieve industrial upgrading.

1.2. Without Long-Term Planning, It Is Difficult to Develop Sustainably. Some art practice projects only take the villages where the art practice projects are carried out as a one-time location for art practice [18]. They only pay attention to their immediate interests without long-term planning, so it is difficult to develop sustainably. When the art activities ended, everything in the countryside returned to its original state and even suffered some damage. For example, since 2014, Phoenix Ancient Village and the China Academy of Art have established Phoenix Art Exhibition Center and sculpture, painting, and various literary and artistic activities

that have gradually been involved in the cultural construction of the village. Although these public art projects actively mobilize villagers to participate, because most of the residents of the village are immigrants with low cultural identity and low participation, many practical projects take artists as the main body. There is no diversified linkage mechanism for sustainability with the local natural environment and residents' lives, and the follow-up is weak.

1.3. Lack of Regional Characteristics and the Loss of Rural Traditional Cultural Spirit. Using public art to carry forward rural local culture, restore traditional folk customs, and rebuild the declining public space in rural areas can effectively arouse the villagers' sense of pride and cultural identity [19]. However, in many contemporary art rural construction activities in China, the loss of rural traditional culture is serious. The reasons are as follows: first, the historical resources such as rural traditional buildings and intangible cultural heritage have been continuously destroyed, and the traditional regional cultural resources and spirit have gradually weakened and even disappeared, which increases the difficulty of art rural construction; second, the construction mode of urban assimilation also affects the development of rural areas, and the phenomenon of rural homogenization is obvious; and third, many artists have forcibly implanted some concepts that have nothing to do with the local cultural environment into the construction of rural culture. To some extent, such public art is not only the rescue and revival of rural culture but also the invasion of rural resources.

1.4. Lack of Linkage and Cooperation Mechanism, and the Short Output Income of Rural Cultural Industry. The involvement of public art in the rural cultural industry can produce different paths according to different rural types [20]. For example, villages with original ecological culture and ancient buildings can develop cultural tourism, tourist souvenirs, experience halls of intangible cultural heritage, and other industries. Rural areas with superior natural conditions and beautiful environment can develop homestay, ecological agriculture experiences, and other industries. Suburban villages use public art projects to package and develop the leisure tourism industry. However, all kinds of villages still face many problems in industrial output. First, the income of public art combined with rural cultural industries is short, and these industries are idle after art festivals and related art activities. Second, excessive industrial packaging has affected the lives of indigenous people. Many migrant people have become the vested interests of the rural cultural industry, while indigenous people have become the marginal groups of rural industrial economy. For example, the overcommercialized packaging of some rural ancient buildings is incompatible with local culture and breaks the daily life of aborigines. Third, the development mode of rural cultural industry is single and lacks the linkage and cooperation mechanism of multiresources, so it is difficult to achieve long-term benefits.

Therefore, based on 3D technology, Kharroubi et al. [21] studied the impact of public art on rural culture, promoted the development of rural areas while carrying forward and disseminating national excellent traditional culture, and laid a practical foundation for the development of rural public art. Florian et al. [22] studied the relationship between public art and rural culture from the perspective of time-space correlation depth video, revived the countryside by means of public art intervening in rural culture, obtained certain value, and provided some ideas for the later practice of “art intervening in the countryside.” Zhou et al. [23] proposed a perspective algorithm for converting 2D video into 3D video, studied the impact of public art on rural development caused by the intervention of rural culture, met the mutual communication methods among villagers, promoted the linkage development of public art and rural cultural industry, and realized the revival and independent and sustainable development of new rural culture. Nico et al. [24] focused on the algorithm structure of a 3D video convolution network, established the relationship between public art and rural culture, and predicted the enforceability of public art in rural revitalization according to China’s current national conditions.

In general, based on the perspective of 3D video, this paper first studies the principle of 3D video, then discusses the pattern analysis algorithm of 3D video in detail, and establishes the corresponding framework. Finally, from the perspective of 3D video, this paper analyzes the development of public art in rural culture in various villages of Beijing, Shanghai, Chongqing, and Tianjin; makes a comparative analysis; and puts forward corresponding countermeasures for the development of rural culture, so as to provide a new idea for public art to intervene in rural culture.

2. Principle of 3D Video

Human behavior recognition in video has important application prospects in intelligent monitoring, smart home, and other environments. However, due to the influence of camera perspective, the research of human behavior recognition based on multiview video is highly challenging. In the field of behavior recognition, according to different video types, the mainstream methods can be divided into two categories: behavior recognition based on 3D video and behavior recognition based on depth video.

Although there are many hardware devices with 3D functions at present, there has always been the problem of insufficient film sources for 3D materials that can be used for display, which greatly restricts the promotion of 3D technology. The existing 2D video resources have a wide variety of simple acquisition methods, and 2D technology is relatively mature. Converting these existing 2D videos into 3D videos with three-dimensional effects is a good way to solve the problem of insufficient film sources. The process from ordinary 2D video to 3D video mainly includes two key steps [25, 26]: (1) recover the lost depth information from the input 2D video and generate the corresponding depth map and (2) synthesize virtual stereo image pairs.

At present, there are two mainstream 3D content generation methods: one is that researchers use computer imaging tools and synchronous cameras to generate 3D images or videos, but this method is not only time-consuming but also expensive; The second is to generate 3D content by using the depth map. This method can be divided into the manual method, semiautomatic method, and fully automatic method. The manual method is to manually allocate the depth value for the image/video [4]. The 3D content generated by this method is of the highest quality, but it consumes much more energy and financial resources than other methods. The semiautomatic method is to conduct 2D-3D conversion by manually intervening with the computer. This method is more efficient than the manual method, but it also requires additional labor and time overhead. The fully automatic method can generate 3D content with little or no manual intervention, and the whole process is in the charge of the computer, which not only improves the speed but also saves a lot of resources.

In order to better apply 2D-3D conversion technology to daily life, researchers have invested a lot of energy in the fully automatic conversion method based on the depth map and finally use significance detection for 2D-3D conversion [27]. The task of saliency detection is to detect the most attractive target/region in an image. This mechanism can provide great help for the processing task based on visual information. Therefore, we can use the properties and characteristics of saliency detection to convert the saliency map into another depth map for 2D-3D conversion so that the objects with high saliency are closer to the observer and the objects that are not interesting are far away from the observer. When converting 2D video to 3D video, we should standardize the image and then improve the video signal through the significance principle, so as to obtain a 3D video image through different electromagnetic waves. The 2D-3D conversion process is shown in Figure 1. The main focus is to generate the saliency map conducive to 3D video generation and then calculate the best 3D simulation value through parallax.

3. Model Building from 3D Video Perspective

The model from the perspective of 3D video is mainly based on a convolution neural network, which is composed of a set of convolution and pooling layers with nonlinear activation functions. Although the pooling layer can effectively increase the receptive field, for pixel-level prediction tasks, using the pooling layer for downsampling will cause the loss of detail information and even lead to the failure of reconstruction of objects with small targets. Recently, researchers use hole convolution as a substitute for feature extraction. This method is not easy to cause loss of detail when calculating features at any scale. The reason is that when using hole convolution for calculation, the receptive field can be increased without a pooling layer so that each convolution output contains a large range of information. Figure 2 is a schematic diagram of target tracking from a 3D video perspective. It can be seen that in the perspective of a 3D video, target tracking is divided into keyframe collection, preprocessing, extracting the moving area, obtaining the

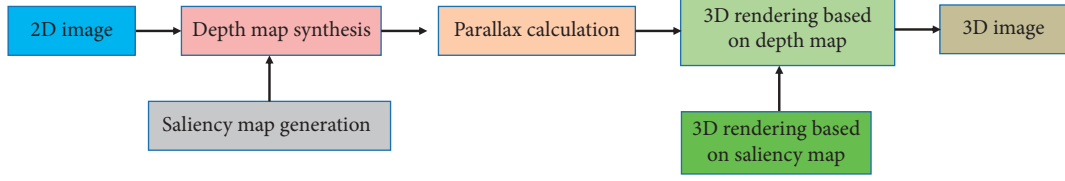


FIGURE 1: Process of 2D-3D conversion.

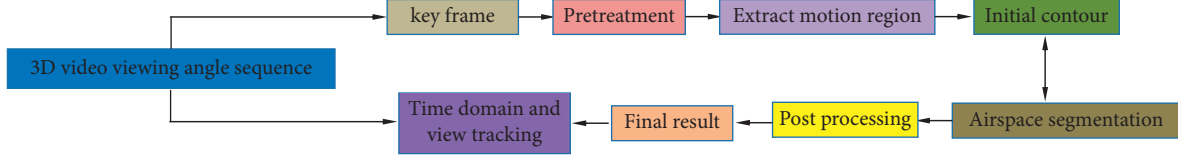


FIGURE 2: Schematic diagram of target tracking from a 3D video perspective.

initial contour, and then spatial segmentation. After post-processing, the final result can be obtained, so as to realize the comprehensive tracking analysis of the time domain and the field of view.

Multiscale feature extraction is a common method to improve the accuracy of 3D video models. This method extracts spatial features of different scales by using hole convolution kernels with different hole rates; the hole convolution kernels reflect the animation definition in 3D video. Through the hole convolution kernels, the size of each resolution of 3D video can be obtained, and then the 3D video can be clarified. Then, these feature maps and outputs of the final spatial feature map can be connected. Let the dimension of the input three-dimensional tensor T be $H \times W \times D$, and H and W are the length and width of the image, and D is the number of channels of the tensor. L is a set of convolution kernels $\{C_l\}_{l=1}^L$, and the size of the convolution kernel is $n \times n$. The void ratio is $\{r_l\}_{l=1}^L$, and the convolution kernels with different void rates have different receptive fields (α). The receptive field represents the spatial structure of the convolution kernel, which can reflect the number of frames and quality resolution of the image. The size of the receptive field is shown in (1). In the calculation process, each layer will output a feature map $\{F_l\}_{l=1}^L$, as shown in (2).

$$\alpha = [(n-1)r_l + 1]^2, \quad (1)$$

$$F_l = C_l \times T. \quad (2)$$

It can be seen from (2) that when T remains unchanged, the output characteristic graph is only related to the size and void rate of the void convolution kernel. Although the size of each output feature image is the same, due to the different void rates, the size of the receptive field is also different. Sometimes, the size of the receptive field will exceed the input image, which is just like observing the image at different distances. If the distance is too far or too close, you will not see all the information about the object. Only from the appropriate distance and background can you get the effective salient object/region.

After obtaining the feature map $\{F_l\}_{l=1}^L$, they need to be connected together and sent to the improved bidirectional

ConvLSTM as input. Bidirectional ConvLSTM is a direct input algorithm, which can greatly improve the accuracy of the algorithm in the input process and make the feature maps more closely connected. Therefore, the first part of the model can learn features from different scales through the data set. The formula of characteristic diagram connection operation is shown in the following formula:

$$\mathbf{P} = [\mathbf{F}_1, \mathbf{F}_2, \dots, \mathbf{F}_n], \quad (3)$$

where $[\]$ represents the connection operation and \mathbf{P} is the characteristic diagram obtained after the connection operation.

In addition, since the depth residual framework is also applicable to the model in this paper, the source input characteristic graph \mathbf{T} is also added to the connection operation, that is,

$$\mathbf{P} = [\mathbf{T}, \mathbf{F}_1, \mathbf{F}_2, \dots, \mathbf{F}_n]. \quad (4)$$

As we all know, ConvLSTM is mainly composed of four parts: memory cell \mathbf{c}_t , input gate \mathbf{i}_t , output gate \mathbf{o}_t , and forgetting gate \mathbf{f}_t . \mathbf{c}_t is a kind of state accumulator, which is controlled by the other three parts \mathbf{i}_t , \mathbf{o}_t , and \mathbf{f}_t . When the input door is open, the input new data will be added to \mathbf{c}_t . Similarly, when the forgetting gate is activated, the past cell state \mathbf{c}_{t-1} will be discarded. Whether the final hidden layer state \mathbf{H}_{t-1} will be affected by the current cell state depends on the output gate \mathbf{o}_t . As mentioned above, ConvLSTM can be expressed as follows:

$$\left\{ \begin{array}{l} \mathbf{i}_t = \sigma(\mathbf{W}_i^P \times P_t + \mathbf{W}_i^H \times \mathbf{H}_{t-1}) \\ \mathbf{f}_t = \sigma(\mathbf{W}_f^P \times P_t + \mathbf{W}_f^H \times \mathbf{H}_{t-1}) \\ \mathbf{o}_t = \sigma(\mathbf{W}_o^P \times P_t + \mathbf{W}_o^H \times \mathbf{H}_{t-1}) \\ \mathbf{c}_t = \mathbf{f}_t \times \mathbf{c}_{t-1} + \mathbf{i}_t \tanh(\mathbf{W}_c^P \times P_t + \mathbf{W}_c^H \times \mathbf{H}_{t-1}) \\ \mathbf{H}_{t-1} = \mathbf{o}_t \times \tanh \mathbf{c}_t \end{array} \right. \quad (5)$$

According to (5), ConvLSTM can simply “remember” the spatiotemporal information in the sequence. However, the spatiotemporal information in the front and back directions of video plays a very important role and significance

in significance detection. Therefore, use bidirectional ConvLSTM to $\{\mathbf{P}_m\}_{m=1}^M$ for bidirectional spatiotemporal feature extraction. In the process of extraction, attention should be paid to maintaining the space-time information in the left, right, front, and back directions of 3D video and tracking and acquisition at any time to maintain the timeliness of the extraction process.

$$\mathbf{Y}_t = \tanh(\mathbf{W}_y^{Hf} \times \mathbf{H}_t^f + \mathbf{W}_y^{Hb} \times \mathbf{H}_{t-1}^b), \quad (6)$$

where \mathbf{H}^f and \mathbf{H}^b represent the hidden layer states of forward and backward ConvLSTM, respectively; \mathbf{Y}_t represents the final saliency map output after fusing the two-way spatiotemporal information; $\tanh(\cdot)$ indicates the tanh activation function.

When using a saliency map for 2D-3D conversion, the calculation steps of parallax calculation and image rendering based on a saliency map are basically the same as those based on the depth map. This is because, although saliency detection and depth map prediction are two different fields, the prediction maps (saliency map and depth map) generated by the two methods are the same in image attributes, that is, gray-scale images with the brightness of 0–255. It should be noted that the 2D-3D conversion method based on a depth map generates 3D content according to the distance between the object/area and the camera lens, while the method based on a saliency map performs 2D-3D conversion according to whether the human eye is interested in the target/area.

In the calculation of parallax, there is little difference between this method and the traditional method. Parallax calculation is to ensure the same number of frames in the conversion of 2D and 3D videos, so as to make the data information of saliency map and depth map consistent. This is to make the 3D video closer to reality and restore the original ecological scene. If the parallax value of the pixel in the figure at (x, y) is $R(x, y)$, then

$$R(x, y) = Z \left[1 - \frac{Y(x, y)}{128} \right], \quad (7)$$

$$Z = \frac{GK}{G + D},$$

where Z represents the maximum parallax and G represents the maximum depth. K is the distance between human eyes, and D represents the distance between human eyes and screen. $Y(x, y)$ represents the significant value in the image (x, y) .

When evaluating the performance of the model from the perspective of 3D video, there are three widely used metrics, namely precision-recall curve, F -measure, and mean absolute error (MAE). In the precision-recall curve, precision represents the percentage of significant pixels correctly predicted, and recall represents the proportion of significant pixels correctly predicted in the truth map. F -measure is used to measure the overall performance of the model and reflects the accuracy of the model, which can accurately characterize the use performance of 3D video model and better represent the accuracy of 3D video. The higher the F -measure of the model, the better the performance.

$$\omega_\beta = \frac{(1 + \beta^2) A_{\text{precision}} A_{\text{recall}}}{\beta^2 A_{\text{precision}} + A_{\text{recall}}}, \quad (8)$$

where ω_β for β is the F -measure of the weight parameter and $A_{\text{precision}}$ and A_{recall} represent accuracy and recall, respectively. The value of β is 0.3. MAE represents the absolute error between the prediction map and the truth map, which represents the difference between the two lines in the precision-recall curve, and it is a microcharacterization method. The lower the MAE value of the system, the better the performance.

$$\delta = \frac{1}{HW} \sum_{x=1}^H \sum_{y=1}^W |Y - G|, \quad (9)$$

where δ indicates the MAE value and H and W represent the length and width of the image, respectively. Y and G represent the binary graph generated after binarization of prediction graph Y and truth graph G , respectively, and the interval is $[0, 1]$.

4. Comparison and Analysis of Experimental Results

4.1. Analysis of the Application of Public Art to Rural Culture from the Perspective of 3D Video. With the advancement of China's economy, various public art activities are booming. This is not only the need for the development of art itself but also the awakening of people's public consciousness. However, we must understand that whether these rural art activities we have sprung up can be carried out for a long time is not just a hothead. It can be called art changing the countryside by drilling into the village and painting a few wall paintings and placing a few sculptures. The entry of art into the countryside does not mean that artists enter the village. The entry of new types of public art into the countryside should be a continuous, in-depth, all-round, and three-dimensional intervention.

This paper selects the rural culture in four municipalities directly under the central government to study. Figure 3 shows the application rate of public art to rural culture from the perspective of 3D video. It can be seen that with the increased time, the application rate of public art to rural culture in the four municipalities directly under the central government shows a downward trend. However, Beijing has the highest application rate, followed by Shanghai, while Tianjin has the lowest application rate. The difference in rural culture between different cities is mainly the difference in local rural traditional culture. The per capita GDP of rural people in developed areas is high. They have time and energy to accept public art, which improves the application rate of rural culture to a certain extent. Meanwhile, the main reason may be that Beijing and Shanghai have a long history, and the rural people have a high degree of acceptance of public art. Therefore, in the process of implementing public art in the rural culture, we should pay attention to the advanced nature and practicality of public art, so as to ensure the public art's application rate in rural culture.

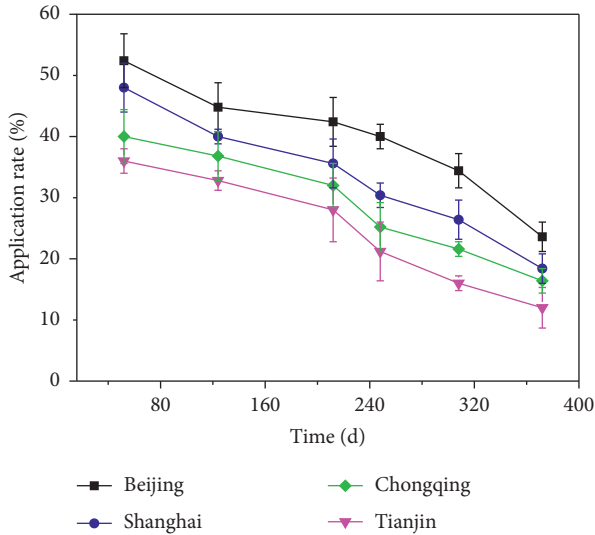


FIGURE 3: Application rate of public art to rural culture from the perspective of 3D video.

4.2. Statistics of Public Art on Rural Cultural Diversity from the Perspective of 3D Video. Today, the development of new types of public art should be integrated into all aspects of our life and create an artistic atmosphere that affects the public. It can be sculpture, mural, architecture, lighting, new media, dialogue, performance, festival design, and so on, which occur in space and affect people’s visual, auditory, tactile, and other feelings. The way for new types of public art to intervene in rural culture must be cross-border, multidisciplinary, all-round, and three-dimensional. In addition to pure art, architecture, sociology, psychology, history, statistics, and even politics can be used as a way to realize public art.

Figure 4 shows the influence of public art on rural cultural diversity from the perspective of 3D video. It can be seen that the integration rate between rural traditional culture, rural planning, and rural language is different in different cities. Among them, Beijing has more in these three aspects, while Shanghai has more in rural planning and less in rural language. Chongqing has a low integration rate in rural planning and a high integration rate in traditional culture and rural language. For Tianjin, due to its rich history and culture, the integration rate of traditional culture and rural language is high, but there is a lack of rural planning. In short, in order to better reflect the integration of public art into rural cultural diversity, the promotion of public art should be carried out according to local conditions according to the culture, financial resources, and rural style of local cities, so as to contribute to the integration of public art into rural cultural diversity and promote the promotion and application of public art.

4.3. Analysis of the Development of Public Art on Rural Culture from the Perspective of 3D Video. Low productivity, dilapidated and backward public infrastructure, massive labor loss, and lack of core competitiveness are common problems in many rural areas in China. It is an ideal direction to

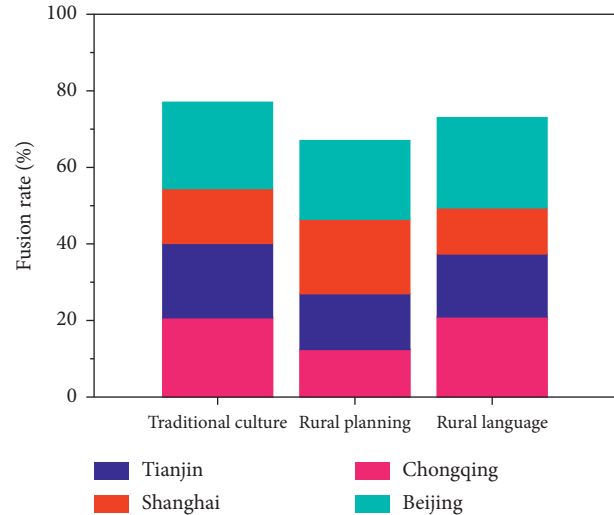


FIGURE 4: The influence of public art on rural cultural diversity from the perspective of 3D video.

change the backward appearance and productivity through the intervention of “art” in the countryside. Encourage people to participate, persuade the government to support, and obtain funds through enterprises to help promote. In the process of transforming art and cultural resources into economic capital for sustainable development in the countryside, whether it is led by the government or the spontaneous behavior of non-governmental organizations, it can form its own relatively perfect hematopoietic function and improve the growth mechanism from production, consumption, and promotion, which is the core issue that needs to be developed urgently for the current “art intervention in the countryside.” Therefore, this paper studies the development prospect of public art for rural culture between different cities and villages.

The development rate of public art in a rural culture based on 3D video between villages in the same city is shown in Figure 5. It can be seen that with the increase of time, the development rate of public art for rural culture shows a trend of increasing first and then decreasing. The development rate is the highest in about 100 days and then slowly decreases to a stable state. Among them, the development prospect of Tianjin is the best, while that of Shanghai and Beijing is poor. The main reason may be that Tianjin is located in the coastal area, and the rural people are more open-minded and easier to accept public art. However, due to the deep-rooted local traditional culture, the acceptance of public art in Beijing and Shanghai has been reduced, resulting in a reduction in the development rate. Therefore, in order to improve the development rate of public art for rural culture, we should improve the innovation of public art, form art in line with local cultural characteristics, stimulate the endogenous vitality of art, and promote the dissemination and development of public art in rural culture.

4.4. Analysis of the Participation of Public Art in Rural Culture from the Perspective of 3D Video. The countryside is not a canvas that can be freely sprinkled. Even if you are a famous

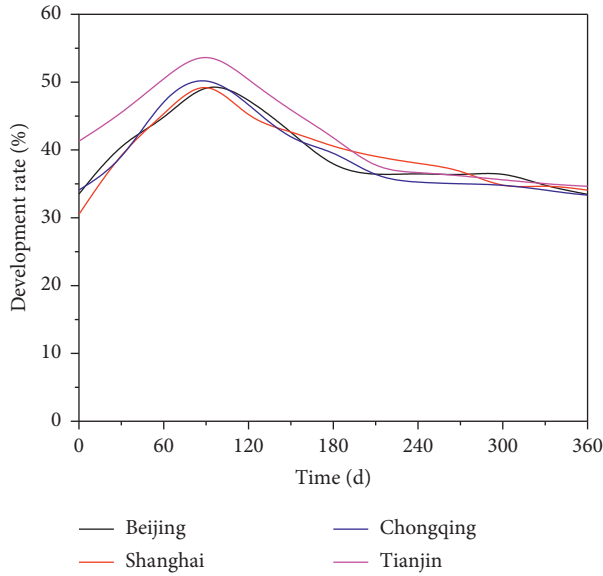


FIGURE 5: Development rate of public art to a rural culture based on 3D video between villages in the same city.

artist, you cannot forcibly implant your own ideas and works. Forcibly implanting works of art that are divorced from the local environment will not only destroy the life comfort of the local people but also make the work itself extremely embarrassing and even destroyed. The process of art intervening in the countryside must be completed imperceptibly. Art practitioners entering the countryside should strive to be part of the local people, lay down their bodies, enjoy with the people, integrate themselves in the way of emotional transfer, and feel their own feelings in the process of practice, so as to achieve growth. Public art is definitely not an artist’s personal stage. Artists leave after finishing work, while local residents have to stay with the work all their life. Therefore, equal participation and mutual understanding are very important. Let them slowly understand why they do this, whether it is meaningful to them, and whether it can trigger emotion, rather than being imposed as a guide.

Figure 6 shows the participation of public art in rural culture from the perspective of 3D video. It can be seen that Beijing’s public art has the highest participation in rural culture, followed by Shanghai and Chongqing, while Tianjin has the lowest. The possible reason is that Beijing and Shanghai have a high comprehensive economic capacity and higher education culture, which affects the rural people’s pursuit and appreciation of public art, so their participation is high. Due to the low comprehensive economic capacity of Tianjin, rural people pay attention to improving their quality of life and have no time and energy to consider public art, which leads to the reduction of participation. Therefore, if we want to improve the participation of public art in rural culture, we should focus on solving the income level of local rural people, increase the publicity of local traditional culture, and make the villagers accept the new public art.

When evaluating the participation of public art in rural culture in different cities, we should consider the proportion

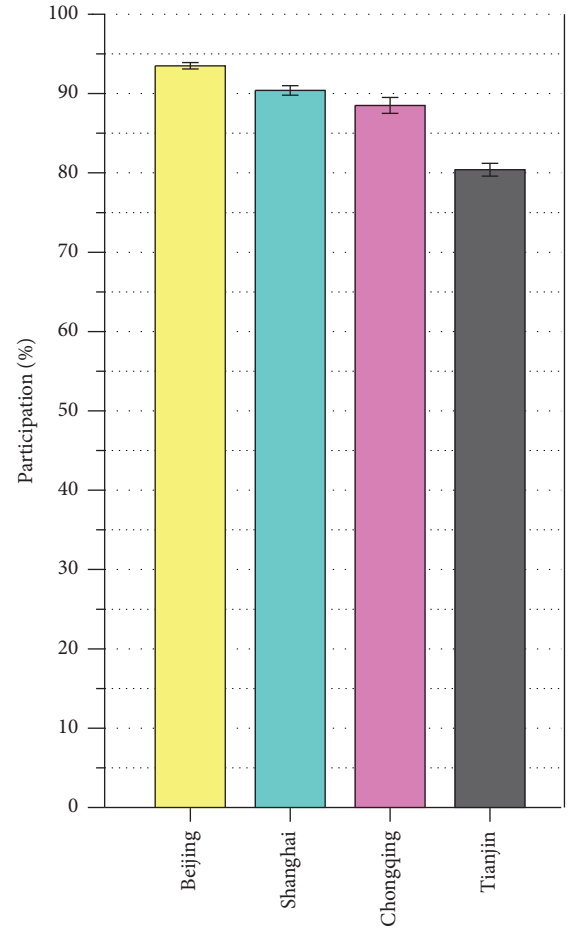


FIGURE 6: Participation of public art in rural culture from the perspective of 3D video.

of traditional culture, rural planning, and rural language. Figure 7 shows the proportion of rural culture among different cities. It can be seen that the proportion of traditional culture and rural planning in Beijing is relatively high, that of rural language in Shanghai is the highest, that of Chongqing is the third, and that of Tianjin is the lowest, which is consistent with the participation of public art in rural culture. Therefore, if we want to improve the participation of urban public art in rural culture, we should start from the local rural traditional culture. Planning and language should be arranged to mobilize the labor enthusiasm of local people and make them have the courage to accept advanced public art, so as to promote the prosperity and development of rural culture.

4.5. *Statistics of Rural People’s Sense of Achievement of Public Art from the Perspective of 3D Video.* The sense of achievement of the rural people represents the yearning and expectation of the local people for a better life. If the public art can be integrated with the local rural culture, the sense of achievement of the people will be higher. Investigate and analyze the rural people in four cities to analyze the people’s sense of achievement. The fulfillment of public art from the perspective of 3D video among people in different cities and

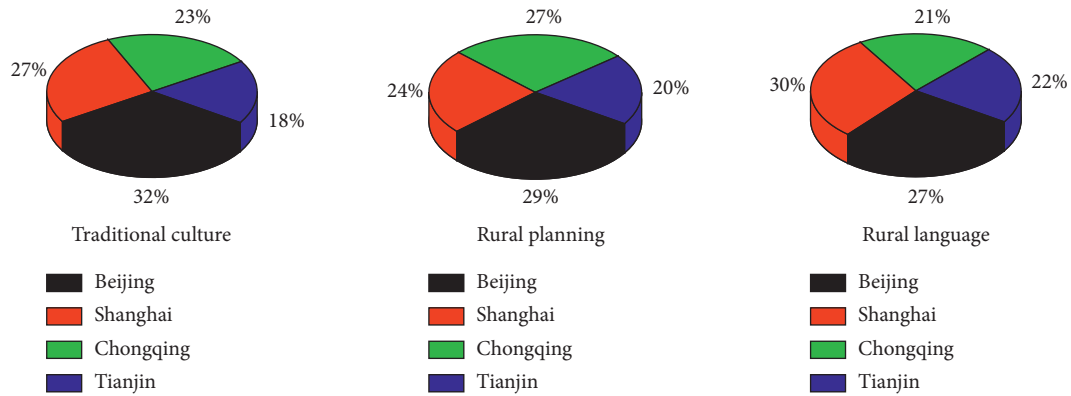


FIGURE 7: Proportion of rural culture among different cities.

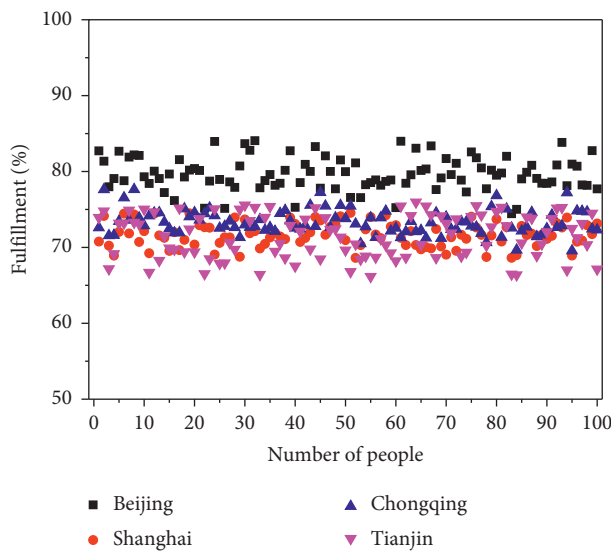


FIGURE 8: The fulfillment of public art from the perspective of 3D video among people in different cities and villages.

villages is shown in Figure 8. It can be seen that the rural people in Beijing have the highest sense of achievement in public art, and the fluctuation of everyone's sense of achievement is small, followed by Chongqing and Shanghai, while the people in Tianjin have the lowest sense of achievement, and the fluctuation is also large. The main reason may be related to the local economy. The citizens of Tianjin are busy making a living and lack appreciation of public art, while the per capita income of Beijing and Chongqing is high; rural people have time to enjoy the beauty of public art, so their sense of achievement is higher.

5. Conclusion

Public art has a great impact on the development of rural culture. From the perspective of 3D video, this paper studies the application principle of 3D video and establishes the corresponding model. Then, the model is applied to four municipalities directly under the central government to study the three-dimensional intervention mode of public art for rural culture, analyze the development prospect of public

art for rural culture in each city, and put forward countermeasures according to the corresponding problems, so as to return public art to public life and promote the prosperity and development of rural culture.

Data Availability

The data set can be accessed upon request.

Conflicts of Interest

The authors declare that there are no conflicts of interest.

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