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Research Article

Cover Design of Public Service Advertisement Based on Deep Image Rendering Technology

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With the development of digital multimedia technology, public service advertisement covers are mostly released in the form of animation, mainly in the form of two-dimensional and three-dimensional animations, disseminating artistic energy through artistic expression, and unknowingly imparting laws, rules and morals to the public, promoting national traditional culture, and establish a good social image through public service advertisements. With the rapid development of image processing technology and the continuous upgrading of display devices, people have begun to pursue more three-dimensional and immersive digital display technologies. According to the Criminisi algorithm, it mainly repairs the edge defects in the source image, and then updates the pixel confidence of the repaired image to start the next repair until the repair is completed. In order to make the public service advertisement cover design meet the needs of the market, the advertisement cover is designed through image drawing technology, the collected advertisement video is passed through Criminisi digital image restoration technology and its classification, and the improved Criminisi algorithm is explained to repair the advertisement image, and then the mean shift Clustering (Mean Shift Clustering) algorithm iteratively counts the processed images. The processing of the public service advertisement cover through the depth image rendering technology greatly reduces the repair rate without affecting the repair quality, restores the damaged image more accurately, and can reduce the video point rate. It can be increased to 0.87, saving 29% of the bit rate.

1. Introduction

Image has the directness of the senses. It acts on the visual system of the body in the form of light, color, shape and other perceptual forms, bringing stimulation and pleasure. Images can directly stimulate the senses, and act on the human visual system in perceptible forms such as light, color, and shape, bringing intuitive stimulation and pleasure. With the development of digital technology and Internet technology, the Internet is widely used in people's social life, and the public's demand for visual enjoyment continues to grow. There are more and more researches on depth image rendering technology, which not only enables the image to achieve the optimal propagation effect with the lowest loss, but also provides new ideas for the optimization of user experience.

The depth image rendering technology collects the real scene data through the camera, and obtains the virtual view-point rendering image according to the image rendering and the depth image rendering [1]. The Criminisi algorithm used in this paper is based on repairing the shortcomings of the image. For the shortcomings of the Criminisi algorithm in image processing, an improved Criminisi algorithm is proposed. This improved algorithm can obtain high-quality images faster and more effectively. It makes the advertisement cover more real and appealing. Through the design of the cover of public service advertisements through deep image rendering technology, this new imaging technology can enhance the appeal of public service advertisements and achieve publicity effects.

In order to change the publicity form of traditional public service ads and improve the publicity of public service ads, the image is repaired through the improved criminisi algorithm. The application of animation in public ads can not only restore the damaged image, reduce the bit rate of

video points, but also improve the speed of image processing. Through image rendering technology to improve the sensory stimulation of the cover of public service advertisements, so as to help the audience better understand the importance of animation in public advertisements and spread positive energy.

2. Related Work

Public service advertisements spread positive energy through the media, spread various values and codes of conduct to people through different media, and guide people to accept a new way of life. It is the most direct and timely publicity. Niederdeppe developed a detailed content analysis codebook to reliably determine the extent to which theoretical structures and other creative advertising elements are reflected in the content of alcohol-related public service announcements (PSAs) [2]. Through the use of narratives in public service announcements, Kim EA explores the understudied relationship between two key variables—the empathy a narrative induces and the degree of efficacy possessed by bystanders [3]. Calfano BR reports the results of three field-based experiments randomizing the air dates of PSA on three independent radio stations. The results show that PSAs have a significant but transient effect on audience behavior [4]. Pokus MS surveys perceptions of variously worded and illustrated Public Service Announcements (PSAs). When the leaflet has no image, people prefer the call to highlight the issue, but when the image is next to the call, people prefer the request-based call [5]. These studies intelligently reflect everyone's attitude towards public service advertisements, and cannot effectively guide everyone to love public welfare.

Image rendering technology is to use limited viewpoint images to directly synthesize virtual viewpoints through relevant knowledge of computer vision. Huang B uses Mask R-CNN for instance segmentation on RGB images to avoid mixing segmentation results. Then the Criminisi algorithm is used to restore the missing depth information of the object and restore the empty pixel area [6]. X Ou studied the Criminisi inpainting algorithm based on image segmentation in detail, and on this basis proposed an improved priority formula image inpainting algorithm [7]. In order to restore the original scene of the damaged image and obtain the most realistic restoration effect as possible, Sun J uses the SIFT algorithm and the RANSAC algorithm to register the reference image and the target image and project it to the target image. The unrepaired regions are then self-healed using the Criminisi algorithm [8]. In order to remove multiple combined distortions with unknown mixing ratios, Zhang J proposed a deep reinforcement learning-based method to restore distorted images, where actions are defined as multiple pixel-level image denoising operations such that similar actions have similar value, thus avoiding overfitting of state-action value estimation [9]. J Zhou decomposes the rough transmission map into base and detail images through guided filters. Finally, the restored image is automatically level processed to improve the contrast of the image [10]. Majee S proves that the current model has a unique global

weak solution using Banach's fixed point theorem, applied to a set of grayscale images to illustrate the image denoising ability of the proposed model, the results confirm that the model has good performance in noise removal and edge preservation better results [11]. These image rendering algorithms are instructive in some areas, but are not yet compatible with the design of ad covers and can be further improved.

3. Research on Deep Image Rendering Algorithm for Public Service Advertising

3.1. Criminisi Algorithm. The one-way information dissemination mode of traditional media can no longer fully meet the needs of the public in the information age. The Criminisi algorithm repairs the incomplete parts of the image through the rule information in the image. With the development of computer and multimedia technology, the Criminisi algorithm has penetrated into many fields and is used for image or video repair, so that the image can be displayed more perfectly in front of the public. The Criminisi algorithm pays attention to the double restoration of image structure information and texture information, and emphasizes the serious influence of the restoration sequence on the image restoration effect. It uses the method based on the illuminance line to judge the priority of restoration, which greatly avoids the traditional texture synthesis algorithm. The repairing discontinuity and incompleteness caused by the judgment of the synthesis sequence [12]. Through the Criminisi algorithm, the image cover of public service advertisements can be repaired from the edge to the inside, which makes the image smoother and the performance effect is fuller.

The image inpainting algorithm uses the known information in the image to determine the filling order of each hole pixel in the image based on the sample, and extracts the rectangular block centered on the current highest priority hole point, that is, the block to be repaired, and uses the same size as the rectangular block, sample the non-damaged area in the image, and search for the optimal matching block that is most similar to the block to be repaired to fill the missing information in the block to be repaired [13]. As the damaged area of the image continues to decrease, the priority is also updated, and the process of searching, matching, and filling is repeated continuously until the block-by-block repair of all hole areas in the image is completed [14]. At present, the method of repairing images with holes drawn based on DIBR mainly draws on the repair method based on sample image repair. Generally speaking, the key to realize DIBR virtual image rendering includes 3D image conversion and hole filling. Among them, 3D image conversion is the core of DIBR, and hole filling is the main difficulty in DIBR. The implementation process is shown in Figure 1.

The three-dimensional images are visually distinct in color, giving people a real and immersive feeling, with a strong impact and impressive impression. The core technology of DIBR is three-dimensional image transformation, that is, the 3D-warping technology mentioned above. The animation form is used in public service advertisements, and the different forms of expression and techniques show
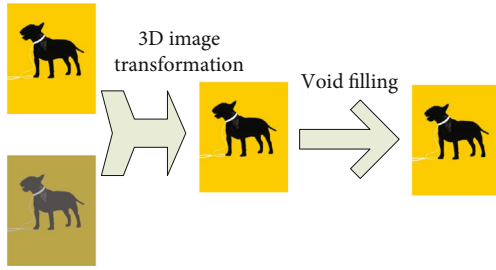
Figure 1: DIBR system image rendering.

Figure 2: Conversion between world coordinate system and image coordinate system.

different styles of public service advertisements, showing different visual effects for the audience. This technology uses the input color video and the corresponding depth video, and then projects each pixel of each frame in the video into the three-dimensional space according to the camera parameters, and finally projects the pixels from the three-dimensional space to the target viewpoint image plane [15]. After three-dimensional image transformation, viewpoint planes originally in different coordinate systems can be connected, which provides theoretical support for the realization of virtual viewpoint rendering technology [16]. Figure 2 shows a schematic diagram of the transformation between the world coordinate system and the image coordinate system.

On the basis of mastering the design principles of combining situational interaction forms with public service advertisements, carry out practical preparations for design projects. Depth images processed through virtual scene visualization are a key technology in 3D video systems, however, depth coding distortion can greatly affect the performance of subsequent virtual viewpoint rendering [17]. The most popular forms of public service advertisements are interactive and implanted, and the image settings are mainly character positioning and scene matching. Assumptions about characters need to be exaggerated and boldly unique in order to play a decisive role in advertising expression.

By describing, storing, recognizing and understanding the image through the depth image rendering technology, a virtual viewpoint rendering image is generated [18]. After the image is processed by the virtual viewpoint drawing image technology, the filter window of each pixel in the depth image is determined according to the regular focus of the center interval, and then the image is processed in depth according to the method of weighting filter, and the different feature information is effectively Fusion reduces the problem of image holes and noise, so as to obtain better virtual viewpoint images and save time and cost [19]. The structural block diagram of the method is shown in Figure 3.

The method for computer to acquire scene depth information includes: using hardware equipment to complete the acquisition of depth information and using the stereo matching algorithm based on the principle of human eye parallax to estimate the depth information [20]. Whether it is binocular parallax or motion parallax, the main factor for people to feel three-dimensional sense is parallax [21]. Parallax refers to the difference between objects in the same physical space in different videos, while depth refers to the
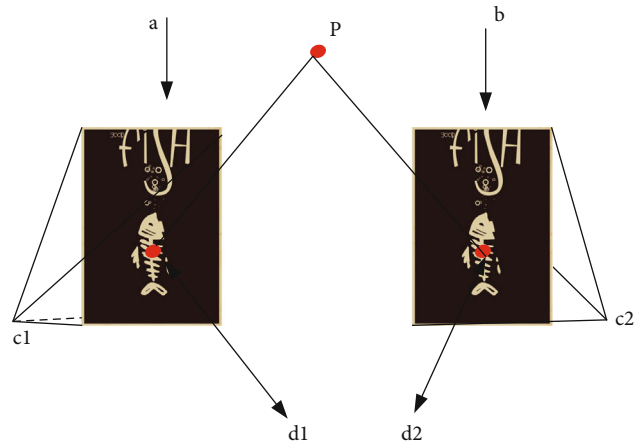
distance of an object to the camera [22]. By comparing depth and disparity and finding exercises between the two, you can use the relationship between the two to find the evolution of image changes. The parallax is related to the depth. The parallax of the two cameras can be obtained by the similar triangle formula:

$$a_r - a_I = \frac{BF}{Z} \tag{1}$$

Assuming that the depth is d, then the relationship between depth and disparity is:

$$Z = \frac{BF}{a_r - a_I} = \frac{BF}{d} \tag{2}$$

It is not difficult to find that the depth of the pixel is inversely proportional to the parallax D, and is directly proportional to the focal length f and baseline width b of the camera. Therefore, as long as the parallax D is obtained through an appropriate algorithm in this paper, the depth information of the pixel can be obtained according to the configuration and parameters of the camera. According to the acquisition, storage, recognition and understanding of the original image data, these processes find the image rules and repair the incomplete image position through the rules, which can improve the efficiency of image restoration.

3.2. Improved Criminisi Algorithm. Although the Criminisi algorithm can achieve the joint restoration of image structure information and texture information to a certain extent, it still has the problems of long restoration time and high mismatch rate [23]. The improved Criminisi algorithm is relatively smooth for the restoration of texture information, and the larger the texture block, the better the characteristics of the sample can be maintained. The depth factor is introduced into the Criminisi priority calculation formula as auxiliary information to determine the edge structure of the image, so as to increase the weight of strong structure information. After fully analyzing the characteristics of the
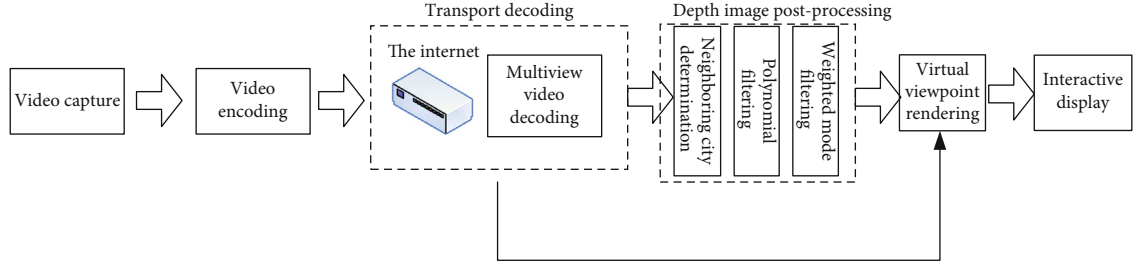
FIGURE 3: Depth map processing method.

TABLE 1: Theoretical basis of the principle of complementary advantages.

Regional division			
Algorithm evaluation		Flat area	Non-flat area
Criminisi algorithm	PSNR	Better	Generally
	Time	Soon	Soon
Improved Criminisi algorithm	PSNR	Generally	Better
	Time	Longer	Longer

Criminisi algorithm and the improved Criminisi algorithm, a principle of complementary advantages is proposed, as shown in Table 1.

This principle takes advantage of the advantages of each algorithm, and uses the Criminisi algorithm with good effect and relatively short time in the flat area of the image; in the non-flat area of the image, the algorithm with good effect but relatively long time is used [24]. The algorithm in this paper maintains the linearity and texture structure of the image, and uses multi-stage synthesis in the synthesis process to make up for the structural fracture defect that occurs when the Criminisi algorithm is repaired. It can better balance the performance and cost of the algorithm, which is the best compromise between quality and speed.

Since the number of synthesis is decreasing in variance order, the time spent cannot increase much compared with the Criminisi algorithm. In the Criminisi algorithm, after repairing a block to be repaired, the affected boundary priority needs to be updated in real time $T(t)$, which $R(t)$ is updated to the center point of the repaired block $T(t)$. As the repair progresses, $R(t)$ it gradually becomes smaller or even degenerates to zero, so no matter $Q(t)$ how large the new void point is, the product term $T(t)$ may be zero, so that the point is not preferentially selected, and the texture there naturally cannot be well repaired. So change the priority calculation formula to:

$$T(t) = R(t) + Q(t) \quad (3)$$

The essence of the Criminisi priority algorithm is to use the gradient, that is, the grayscale change of the image, to measure the amount of structural information at the void point. $Q(t)$ The larger the value, the larger the gradient of the image brightness change, the higher the priority. However, considering that different brightness may produce the same gradient value, high-frequency noise is misleading, and when the grayscale change is not obvious, the data items $Q(t)$ cannot accurately identify the diverse structural edge information of complex images, so it often causes Growth of wrong textures.

The depth information reflects the distance between each point in the scene and the camera, the grayscale transformation in the image changes the grayscale value of each pixel in the source image point by point according to the target condition in the image according to a certain transformation relationship. Objects at different positions have different depth values, and at the boundary edges of two objects with different distances, the depth values will change drastically. Therefore, when the grayscale change at a certain structural information is not obvious, that is, when the $Q(t)$ item is not enough to reflect the information there, the change of the depth information can also make up for the defect of insufficient positioning of the structural information to a certain extent, and the balance is the priority. The understanding of public service advertisements requires a certain aesthetic understanding, which can expand, enrich, perfect and combine the visual pictures and words through understanding, and rise from the primary perceptual understanding to the deep rational thinking. Reason can outwit and remake, but it can never destroy aesthetic judgment. Therefore, the expression of public service advertisements must be precise, regardless of the text or pictures, and can be subtle, but not vague, so as to facilitate the proper understanding of the audience.

3.3. Mean Shift Algorithm. The Mean Shift Clustering algorithm is an efficient iterative statistical algorithm, a non-parametric method based on density gradient ascent. The extended form of the Mean Shift vector is as follows:

$$M_{\mathrm{h}}(a) = \frac{\sum_{n=1}^{i} G((a_n - a)/\mathrm{h}) W(a_n)(a_n - a)}{\sum_{n=1}^{i} G((a_n - a)/\mathrm{h}) W(a_n)} \quad (3)$$

$W(a_n) \geq 0$ weight assigned to the sampling point. a_n If for all samples, the point a_n satisfies:

$$W(a_n) = 1$$

$$G(a) = \begin{cases} 1 & \text{if } \|a\| < 1 \\ 0 & \text{if } \|a\| \geq 1 \end{cases} \tag{4}$$

Suppose that for a probability density function $u(a)$, the kernel function of $u(a)$ known d-dimensional space is $a_n (n = 1, 2, 3, \cdots, m)$ estimated as:

$$\hat{u}(a) = \frac{\sum_{n=1}^{m} k(a_n - a/h) w(a_n)}{h^d \sum_{n=1}^{m} w(a_n)} \tag{5}$$

$$\int k(a) da = 1$$

where $\hat{u}$ is a $W(a_n) \geq 0$ weight assigned to the sampling point a_n and $k(a)$ is a kernel function. Mean The Shift algorithm is an iterative process. After extracting the common factor of a, the transformation gets the following formula:

$$M_h(a) = \frac{\sum_{n=1}^{m} G(a_n - a/h) w(a_n) a_n}{\sum_{n=1}^{m} G(a_n - a/h) w(a_n)} - a$$

$$M_h(a) = \frac{\sum_{n=1}^{m} G(a_n - a/h) w(a_n) a_n}{\sum_{n=1}^{m} G(a_n - a/h) w(a_n)} \tag{6}$$

$$G(a) = e^{-\|a\|^2}$$

If it is satisfied $\|M_h(a) - a\| < \varepsilon$, the loop ends, if not, it restarts the calculation. Internationally, people's subjective evaluation of 3D video quality is mainly based on image quality, image depth and three-dimensional comfort. The evaluation standard grades are mainly divided into five grades, as shown in Table 2.

Public service advertisements focus on social and public interests, disseminate correct concepts of consciousness to the broad social groups, and consciously contribute to society. Only after the audience fully grasps the image metaphors in the advertisement can they fully understand the core content of the advertisement, which requires the advertisement to have strong persuasive power. The so-called advertising persuasion refers to the holding of different forms of advertising activities, so that consumers have a strong desire to buy branded products such as advertisements, thereby stimulating their subsequent purchases and consumption behaviors. It is relative to commercial advertisements, and for public service advertisements, its advertising persuasion is mainly reflected in that it can make the audience fully recognize the values in the advertisements, thereby bringing good value at the practical level. From the perspective of its essence, the metaphors in the advertising images have great similarities with the innovations, which enable the image metaphors to effectively connect things at different levels with the help of emotions and attitudes at the thinking level, thereby make the audience better understand the content to be disseminated, so as to achieve the effect of advertising to persuade the audience. The image metaphor persuasion system in public service advertisement mainly revolves around the content to persuade. Under normal circumstances, the obstacle scale is suitable for non-professionals to use, while

Table 2: Five-level view of images.

Grade	Quality evaluation	Presence of impurities
A	Very good	Unaware
B	It is good	Just noticed
C	Generally	Detect but not hinder
D	Difference	Hate
E	Very bad	Hard to watch

Table 3: Rating table of PSNR.

PSNR	Quality evaluation	Presence of impurities
A(37,100)	Very good	Unaware
B(30,37)	It is good	Detect but not hinder
C(25,30)	Generally	Slightly annoying
D(20,35)	Difference	Hate
E(0,20)	Very bad	Hard to watch

for professionals, the quality scale is used as the judging standard. Subjective evaluation is in line with the visual characteristics of the human eye, and the quality level standard is easy to establish, but due to the influence of objective factors such as the observation environment and the selection of observers, the results are generally disturbed by human factors and have poor stability. Moreover, although some compression algorithms have good subjective effects, they will cause objective distortion, which may be serious. Therefore, in actual evaluation, both subjective and objective evaluation standards are generally used for evaluation at the same time.

The mean-shift algorithm is an optimal gradient ascent method for finding the maximum value of probability density, and provides a new framework for describing and locating daily targets. Mathematical and statistical methods are used for the study of digital images, and commonly used image statistical evaluation measures: image mean, standard deviation, covariance, structural similarity SSIM, mean square error MSE and peak signal-to-noise ratio PSNR, the latter two are the most basic and the most common evaluation methods, the formula expressions are as follows:

$$f = \frac{\sum_{a=1}^{M} \sum_{b=1}^{N} x(a, b)}{M \times N}$$

$$\sigma = \sqrt{\frac{\sum_{a=1}^{M} \sum_{b=1}^{N} (x(a, b) - f)^2}{M \times N}}$$

$$\sigma_{xy} = \frac{1}{M \times N} \sum_{a=1}^{M} \sum_{b=1}^{N} (x(a, b) - f_x)\left(y(a, b) - f_y\right)$$

$$SSIM(x, y) = \frac{\left(2f_x f_y + t_1\right)\left(2\sigma_{xy} + t_2\right)}{\left(f_x^2 + f_y^2 + t_1\right)\left(\sigma_x^2 + \sigma_y^2 t_2\right)}$$

$$MSN = \frac{\sum_{a=0}^{M-1} \sum_{b=0}^{N-1} [u(a, b) - u_1(a, b)]^2}{MN}$$

$$PSNR = 10 \log_{10} \frac{(2^n - 1)^2}{MSE}$$

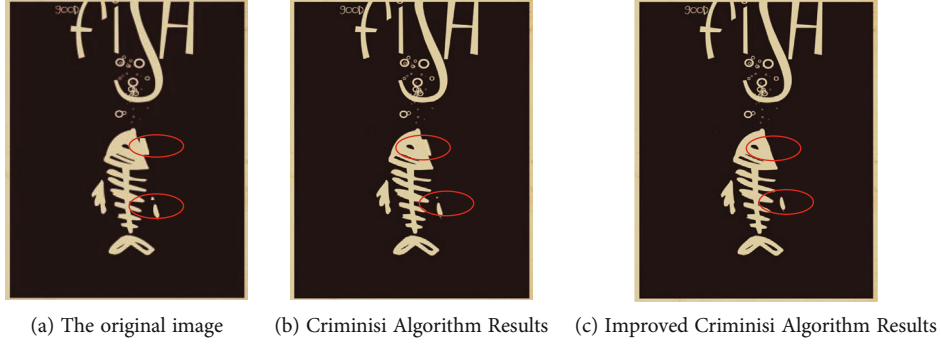$$\tag{7}$$

(a) The original image   (b) Criminisi Algorithm Results   (c) Improved Criminisi Algorithm Results

FIGURE 4: Comparison of subjective effects of filling holes in fishing public service advertisements.

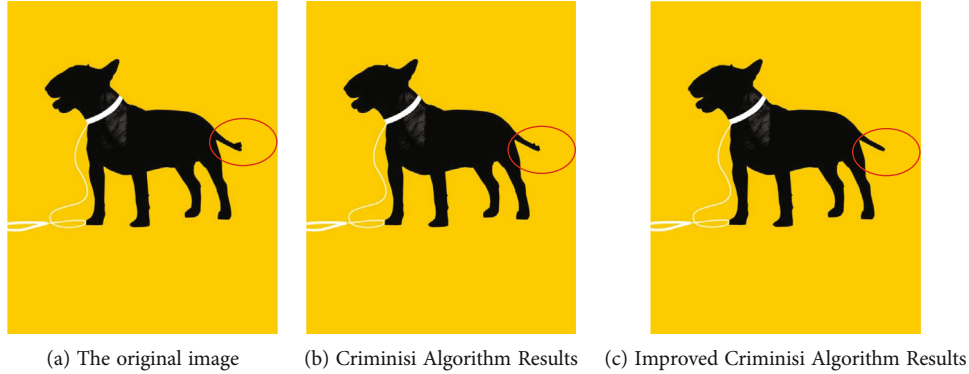(a) The original image   (b) Criminisi Algorithm Results   (c) Improved Criminisi Algorithm Results

FIGURE 5: Comparison of the subjective effect of filling the holes in the puppy public service advertisement.

Draw images based on different error values and signal-to-noise ratios in the images, and then evaluate the images according to individual subjective and objective criteria. According to the MOS, the PSNR value is divided into 5 grades. Different grades represent different image qualities. The PSNR grade table is shown in Table 3:

TABLE 4: PSNR data comparison.

PSNR	Figure 4	Figure 5
Improved Crininisi algorithm	43.764	45.337
Crininisi algorithm	42.337	43.232
The original image	41.279	42.159

4. Cover Design of Public Service Advertisements Based on Deep Image Rendering Technology

4.1. Deep Image Rendering Public Service Advertisements. Virtual viewpoint rendering algorithms mainly include parallax-based, depth-map-based, light-space-based, and model-based. Among them, the process of generating virtual viewpoints through 3D projection or through 2D mapping from the original camera viewpoint is usually called depth-based virtual viewpoint rendering (Depth-based virtual viewpoint rendering). Image Based Rendering, DIBR), usually multi-view video is horizontally corrected in the preprocessing process, so the complex mapping process of DIBR can be simplified to horizontal mapping.

In this paper, the simulation experiment is carried out by using the public service advertisement video about the fishing and stray dog public service advertisement test sequence, and it is proved that the image rendering technology has good performance. After these sequences are compressed by MVC standard encoding, simulation experiments of PSNR value are performed in drawing virtual viewpoints.

In this experiment, viewpoints 0 and 0 of the fishing and stray dog test sequences are selected as virtual viewpoints, viewpoint 2 is an auxiliary viewpoint, and viewpoint 1 is a virtual viewpoint. MVD mainly has relatively higher efficiency for deep encoding of video data transmitted and stored, and is compatible with MVC encoding. Taking MVD as the 3D video format object, the test steps are as follows:

The MVD experiment process is a process of using multiple video signals for depth estimation and signal encoding, and then transmitting and decoding the video signals collected by the camera. New image is obtained after compression, which is convenient for network transmission. The Criminisi repair algorithm is used to estimate the depth map of the test sequence of public service advertisement samples. The estimated depth image sequence is also compressed and video encoded.

After the cover design of public service advertisements drawn by deep image, the satisfaction of public service advertisements with image drawing technology is checked by means of a questionnaire. The purpose of this research is to improve the quality of domestic public service advertisements. Therefore, the survey objects are not limited to
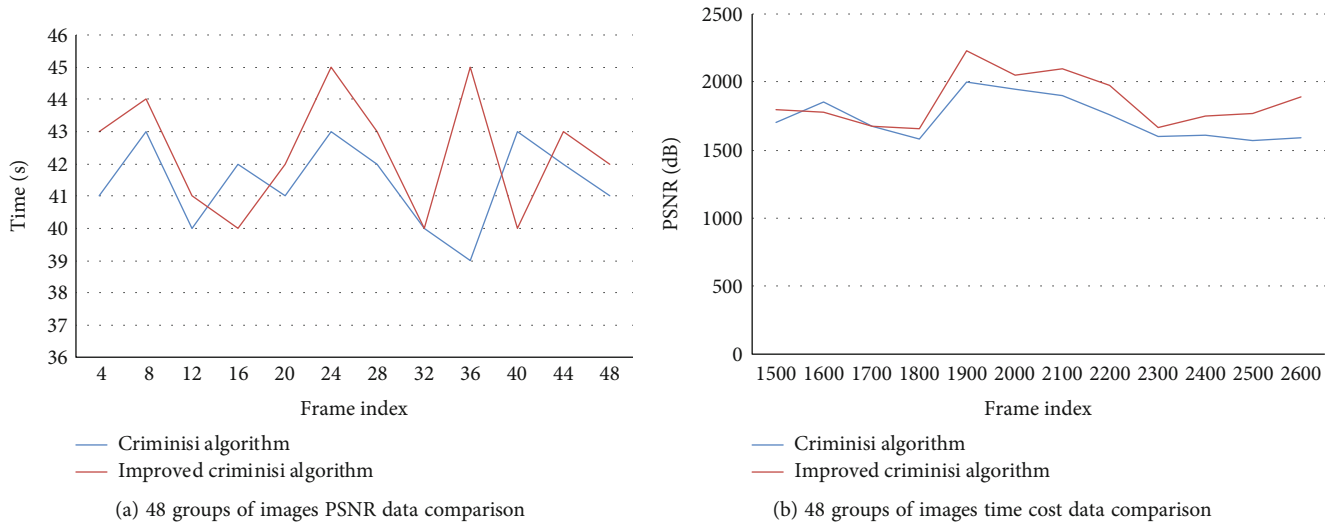
(a) 48 groups of images PSNR data comparison

(b) 48 groups of images time cost data comparison

FIGURE 6: Comparison of PSNR and time cost data.

natural persons of gender, age, occupation, education level and income level.

4.2. Practical Comparison of Image Inpainting Algorithms.

On the basis of the classic Criminisi inpainting algorithm, a new image inpainting algorithm based on depth and gradient is proposed. The improvement and innovation lie in that the depth factor and gradient factor are used as auxiliary information of the priority calculation formula and matching function, respectively, so as to enhance the accuracy of image inpainting. The results show that compared with other algorithms, the image quality restored by the improved algorithm is better.

From the restoration results targeting fish and puppies as shown in Figures 4 and 5, by comparing the cover of fishing and dog public service advertisements, it can be clearly seen that when repairing the advertisement cover, the Crininisi algorithm and the improved Crininisi The algorithm preferentially selects the textures at the fish head and the lower right for downward repair. This is because the priority method based on the iso-illuminance line only considers the change of gray level when repairing the edge target area with large texture contrast around it. Algorithms can be misguided and fail to identify truly significant structural edges, resulting in false extensions of the structure. The improved Crininisi algorithm has changed the repair order due to the addition of depth information. The target with the highest comprehensive priority is preferentially selected for first repair, which restrains the growth of erroneous textures to a certain extent. In the partially enlarged figure, the impact of the improved algorithm on repairing structural information can be more clearly seen, and the PSNR value of the improved Crininisi repair algorithm is also improved, as shown in Table 4 below.

It can be seen from the above two groups of subjective effect comparison Figure 6 that the repair effect of the improved criminisi algorithm is better than that of the crininisi algorithm on the whole, and the PSNR data value also objectively proves the improvement of the image repair

quality of the improved algorithm. Figure 6 provides 48 groups of PSNR data of images filled with holes using different algorithms. The images are all from the public service advertisement video sequence. A large number of experimental data show that using the improved criminisi algorithm to fill holes can greatly reduce the repair speed and restore damaged images more accurately without affecting the repair quality. Through the repairing method of the damaged part of the image, not only can the image be repaired automatically to ensure the integrity of the image, but also the repair time of the image can be saved.

Figure 6 provides the experimental data of 48 non-profit video sequence images with holes drawn by DIBR and repaired by different repair algorithms. The results are enough to prove the effectiveness of the improved Criminisi algorithm and the value of real-time repair.

The viewpoint PSNR value obtained by using the method in this section, as shown in Figure 7, under the condition that the stereo subjective quality of the sensitive area is not degraded, the viewpoint PSNR difference is basically concentrated around 2 dB, which also shows that the method in this section is used. When encoding, the subjective quality of the stereoscopic image is basically unchanged, and the comparison result of the encoding bit rate under the condition that the subjective quality is basically unchanged is also given, as shown in Figure 7, that is, the left view point is in the same Under coding conditions, the improved Crininisi algorithm can save 19% -80% of the code rate of viewpoint coding.

At the same time, the fitting rate-distortion performance of the viewpoint is also given. Figure 8 is the rate-distortion curve diagram of the right viewpoint of each sequence obtained by fitting with a power function.

It can be seen from Table 5 that the rate-distortion performance of the viewpoint in the Mean Shift algorithm is better than that of the improved Criminisi algorithm. PSNR and BR are used to evaluate the coding performance. As shown in Table 5, the viewpoint BDPSNR is improved by at most 0.87 dB, and the BDBR can save at most 29%.
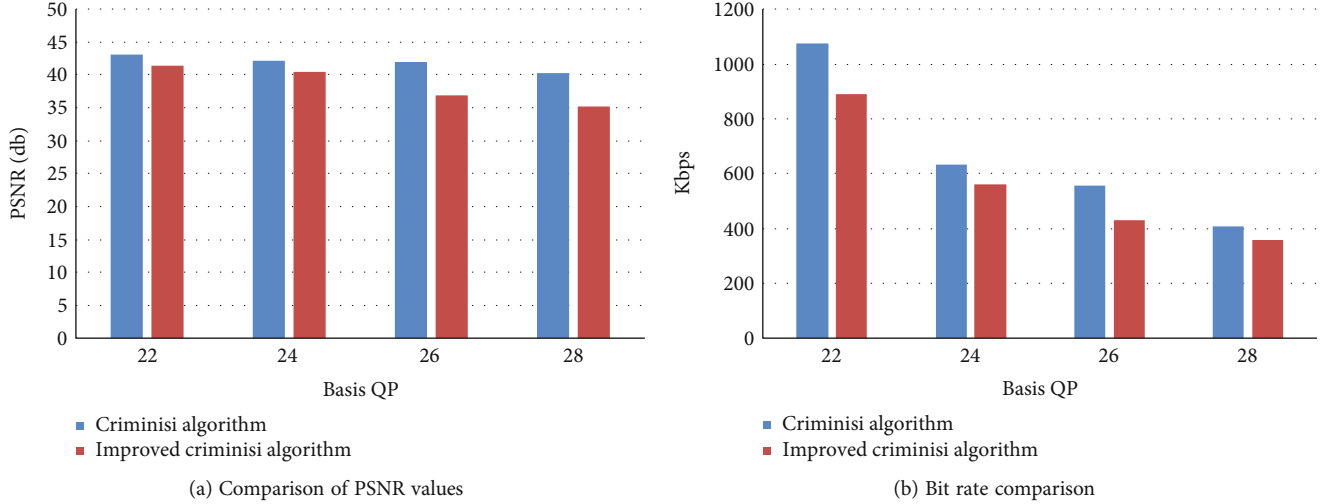
(a) Comparison of PSNR values

(b) Bit rate comparison

FIGURE 7: Comparison of viewpoint PSNR values and bit rates between Criminisi algorithm and improved Criminisi algorithm.
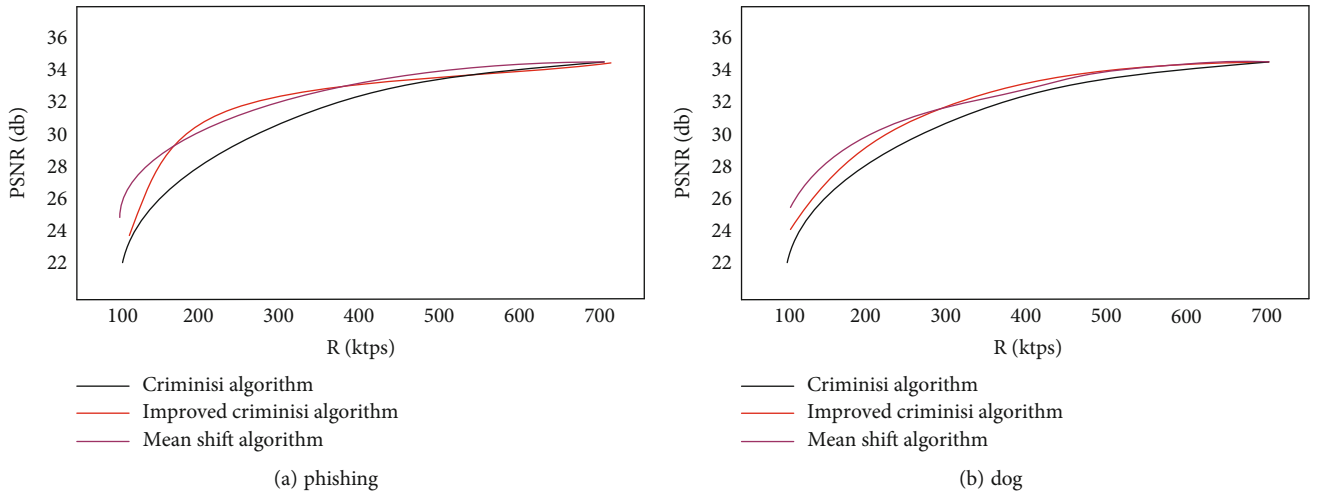

(a) phishing

(b) dog

FIGURE 8: Image distortion curve of fishing and stray dog PSAs.

4.3. Investigation on Cover Design of Public Service Advertisements.

With the rapid development of computer network technology and the popularization of 3G and 4G mobile communication technology, mobile phones are used for instant communication and play a more and more important role in people's daily life. The survey was carried out in the form of Internet. Questionnaires were sent through various internet groups, and 150 valid samples were collected. The male to female ratio of the respondents was about 6 : 4; The age group is mostly 20-40 years old, accounting for 63% of the total. This survey is planned and implemented to more comprehensively understand the public's cognition of the status quo of public service advertising in the current advertising market environment and their development expectations, provide valuable reference opinions for the research of this topic, and point out the direction for the design practice.

Everyone likes to be praised and guided, but does not like to be preached and warned for a long time, as shown

TABLE 5: Average Viewpoint Rate Distortion Performance Comparison.

	BDPSNR(db)	BDBR(%)
Crininisi algorithm	0.67	-22.54
Improved Crininisi algorithm	0.71	-27.33
Mean shift algorithm	0.87	-29%

in Figure 9. Therefore, most of the respondents like "inspiration and guidance" and "humorous" style public service advertisements. But what is surprising is that only 10% of the respondents prefer the form of "interactive participation", which also reflects the cultural differences at home and abroad, and also shows that the application of situational interactive advertising in China is not high., causing the public to have no relevant concepts about it, and lack of experience and understanding of the form of advertising interaction.
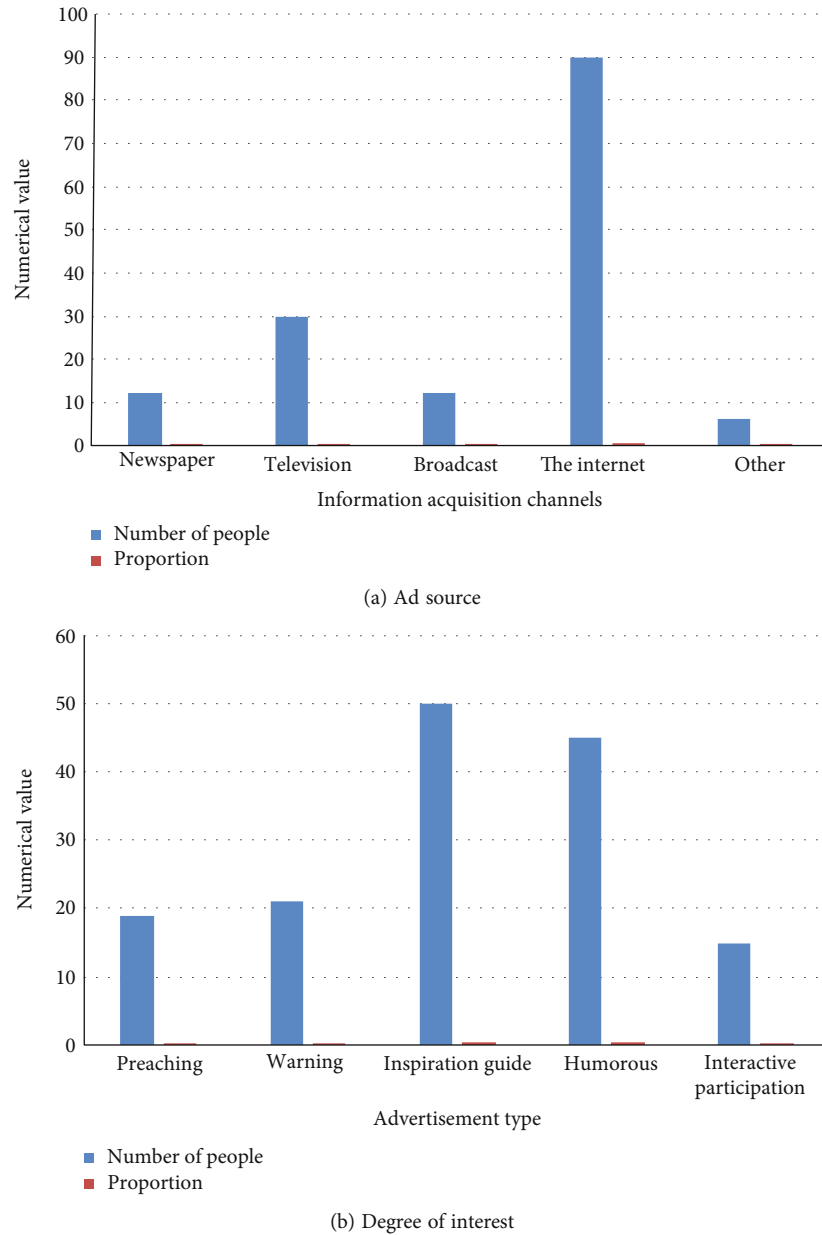
(a) Ad source

(b) Degree of interest

Figure 9: Ad acquisition sources and interest questionnaire data.

5. Discussion

Public service advertisements are conceptual advertisements that promote social morality and civilization construction. Many people choose to turn a blind eye to such advertisements with obvious dogmatism. With the development of the times, the forms of public service advertisements have also changed. The image processing technology is used to artistically process the public service advertisement images, which visually innovates the public service advertisements and injects new impetus into the public service advertisements. Although the Criminisi algorithm can solve the restoration of image structure and texture to a certain extent, it still has certain defects. Therefore, an improved Criminisi algorithm based on the principle of complementary advantages is proposed to solve the problems of long image restoration time and mismatch rate. By processing the video images of public service advertisements and repairing the images through the Crininisi algorithm, this paper proves the huge advantages of 3D animation in the application of public service advertisements, which is conducive to the dissemination of public welfare activities, promotes the development of public welfare undertakings, and promotes the construction of social spiritual civilization.

Data Availability

No data were used to support this study.

Conflicts of Interest

The authors declare that there are no conflicts of interest regarding the publication of this article.

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