Hindawi
Wireless Communications and Mobile Computing
Volume 2023, Article ID 9801082, 1 page
https://doi.org/10.1155/2023/9801082

Retraction

Retracted: Visual Communication-Based Virtual Reality Design of Imaging Information Collection and Display System

Wireless Communications and Mobile Computing

Received 17 October 2023; Accepted 17 October 2023; Published 18 October 2023

This article has been retracted by Hindawi following an investigation undertaken by the publisher [1]. This investigation has uncovered evidence of one or more of the following indicators of systematic manipulation of the publication process:

(1) Discrepancies in scope
(2) Discrepancies in the description of the research reported
(3) Discrepancies between the availability of data and the research described
(4) Inappropriate citations
(5) Incoherent, meaningless and/or irrelevant content included in the article
(6) Peer-review manipulation

The presence of these indicators undermines our confidence in the integrity of the article's content and we cannot, therefore, vouch for its reliability. Please note that this notice is intended solely to alert readers that the content of this article is unreliable. We have not investigated whether authors were aware of or involved in the systematic manipulation of the publication process.

Wiley and Hindawi regrets that the usual quality checks did not identify these issues before publication and have since put additional measures in place to safeguard research integrity.

We wish to credit our own Research Integrity and Research Publishing teams and anonymous and named external researchers and research integrity experts for contributing to this investigation.

The corresponding author, as the representative of all authors, has been given the opportunity to register their agreement or disagreement to this retraction. We have kept a record of any response received.

References

[1] Y. Qi, T. Sun, and Y. Li, "Visual Communication-Based Virtual Reality Design of Imaging Information Collection and Display System," *Wireless Communications and Mobile Computing*, vol. 2022, Article ID 1929596, 12 pages, 2022.

Hindawi
Wireless Communications and Mobile Computing
Volume 2022, Article ID 1929596, 12 pages
https://doi.org/10.1155/2022/1929596

Research Article

Visual Communication-Based Virtual Reality Design of Imaging Information Collection and Display System

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Received 26 July 2022; Revised 24 August 2022; Accepted 1 September 2022; Published 25 September 2022

Academic Editor: Jun Ye

Imaging image acquisition and display has always been an important application field of visual communication art. A good imaging acquisition and display system can give the audience an excellent visual experience. However, conventional imaging image acquisition equipment is too bulky and expensive. At the same time, the existing imaging acquisition technology is generally only suitable for two-dimensional plane design. It is difficult to construct the three-dimensional and realistic sense of actual objects, which makes the development of the entire imaging system slow. Existing imaging acquisition technologies have difficulty keeping pace with the technological age. In this paper, according to the actual needs, a three-dimensional imaging technology was proposed to improve the efficiency of imaging image acquisition. And the principle of imaging information display was used to enhance the visual communication effect. Then, at the algorithm level, virtual reality technology was combined with convolutional neural network-related algorithms to improve the overall accuracy of the algorithm and control the error well. The experimental results showed that the optimized VR technology leads the whole stage in terms of mean square error. Among them, after testing 400 samples in the two experiments, the error performance is controlled below 0.32, and the best error control performance is 0.07; the unoptimized virtual reality technology error control is not ideal. The minimum error failed to break below 0.2, and the optimized algorithm had a high accuracy of 99.3%, which greatly improved the feasibility of the imaging information acquisition and display system.

1. Introduction

Visual communication is an aesthetic design that is presented to the audience after beautifying and modifying the original objects through intermediate media such as visual media. A good visual communication design can reflect the graphic depiction with the characteristics of the times and stunning visual effects. In the entire complex visual communication design process, the quality of imaging image acquisition plays an important role in the visual effect presented by the final visual communication design, because the acquisition of imaging images has a great impact on the material preparation of visual communication design,and the image presented in the final visual communication design is also based on the display results of imaging image acquisition. Therefore, how to design an excellent imaging information acquisition and display system is the key to produce the best visual communication effect. Although the traditional image acquisition equipment and technology are relatively complete in function, they have been gradually unable to adapt to the high demand in this field in the Internet era due to the disadvantages of high price and heavy equipment. How to choose the imaging image acquisition equipment and related implementation methods suitable for the Internet era has become a problem that has attracted much attention in this field. In addition, the final displayed image of the entire imaging information acquisition and display system is limited by the performance of traditional methods, and its imaging accuracy and resolution are not ideal. A good simulation environment is lacking to better display the imaging images. In order to solve the above problems, it is necessary to optimize the original image acquisition device and acquisition method and to improve the overall restoration effect of the imaging image. At the same time, in order to reflect the scientific and professional nature of the constructed system, science and professionalism are important factors in building a system, and this paper will adopt virtual reality related technologies for system design and research.

In this paper, the virtual reality technology is improved, and the convolutional neural network model related algorithm is introduced to improve the performance of the whole system. The practical application is combined to provide scientific support for the imaging information acquisition and display system constructed in this paper to make the whole system more efficient. The innovations of this paper are as follows: (1) the three-dimensional imaging technology is used to realize the three-dimensional design of the information acquisition process of the imaging image, and the operation of imaging information acquisition is simplified. (2) The virtual reality technology is optimized in combination with the convolutional neural network-related algorithms, so that the main performances such as the accuracy and control error of the optimized algorithm are significantly improved.

2. Related Work

Imaging image acquisition and display has always been a hot research topic in the field of visual communication design, and many scholars have done a lot of research to improve a more efficient imaging system. Among them, scholar Ding et al. analyzed the current situation and exposed problems of existing imaging image acquisition equipment and technology. A strategy to optimize the field of view problem in the acquisition device was proposed. Then, by starting from the control condition of minimum resolution, the quality of the whole imaging image was optimized, and finally, the feasibility of this strategy in real environment operation was discussed [1]. Gupta and Choi proposed a novel design strategy for imaging information acquisition and display systems. The acquisition of imaging images was simplified. At the same time, the efficiency of the acquisition process was guaranteed. Compressed sensing techniques were then used to optimize image accuracy after imaging image acquisition [2]. Lockwood and his team described the zebrafish imaging image acquisition process in detail and discussed how to ensure the smooth progress of the image acquisition process without affecting the survivability of the target object in practical situations. Finally, the commonly used imaging techniques were combined and optimized accordingly to solve the above problems [3]. Aiming at the problems encountered in the process of image acquisition of human body structure imaging, Koga et al. proposed an inverse kinematics method to reconstruct human body posture and shape. Finally, the effectiveness of the improved imaging image acquisition was verified by the driving experiment of the car [4]. Lee and his team reviewed and analyzed the existing real-time imaging image information acquisition methods. Imaging image evaluation modes were constructed to optimize the acquisition process. Then, the improved imaging image acquisition method was applied to the thermal imaging field to better acquire NIR images. Finally, the precision and accuracy level of the method were verified by experiments [5]. The above studies on imaging image acquisition and display provided a lot of theoretical knowledge for the development of related systems. The algorithm framework of image acquisition technology was greatly enriched. However, the above research did not adopt a scientific and reliable technology to construct the system and lacked sufficient real data support.

In view of the lack of scientific and reliable technology to build the entire imaging image acquisition and display system, the virtual reality technology can be used to solve the problem. Virtual reality technology is a booming frontier technology, which has also attracted many scholars to study this technology. Among them, the scholar Maples-Keller and his team briefly explained the development process of virtual reality technology. The related research of virtual reality technology in the field of psychotherapy was deeply reviewed and discussed. The achievements of virtual reality technology in this field were listed. Finally, the future work of virtual reality technology in psychotherapy was prospected [6]. Hyun and Lee analyzed the difficulties faced in fire prevention and control and research in the past combined with practical problems. The feasibility of virtual reality technology application in this field was analyzed. Finally, through relevant experiments, the reliability of the designed fire research model was proved [7]. Zhang et al. applied virtual reality technology to the university asset management system and analyzed in detail the role of the technology in optimizing the visualization capability of the system. Finally, the designed system was simulated by a real case to verify the overall performance [8]. Mai et al. combined somatosensory equipment with virtual reality technology to explore the impact of the implementation of this technology on the lives of cerebrovascular patients. The experimental results demonstrated the effectiveness of the method [9]. Ding et al. expounded the current situation of physical education in colleges and universities in actual teaching. The reasons for the unsatisfactory effect of the teaching process were summarized. A specific plan to implement virtual reality technology to construct a physical education system was proposed. Finally, the actual effect of the system was tested through an example [10]. The above-related researches on virtual reality technology have well demonstrated the comprehensiveness and good development prospects of the technology, which played an important role in expanding the application field of the technology. However, the experimental accuracy of the above studies is not ideal, which is difficult to meet the high-precision requirements of imaging images.

3. Construction Method of Visual Communication Art Imaging Information Collection and Display System

3.1. Construction of Imaging Information Acquisition and Display System. Under the background of the rapid development of Internet technology, it is difficult for traditional image imaging information acquisition equipment to meet the high standards and technical requirements of imaging images. Therefore, this paper adopts the thriving virtual reality technology to optimize the whole imaging process. At the same time, when constructing an imaging information acquisition and display system, the traditional method is based on two-dimensional plane design, which makes the proportion and visual effects of the acquired imaging images not close to reality and the visual communication is too simple. Based on this, this paper proposes a three-dimensional imaging technology to improve the information acquisition process of imaging images, so that viewers can perceive the acquired imaging images more intuitively and clearly. This is an attempt to embody realism. The information acquisition process under the 3D imaging technology is shown in Figure 1.

It can be seen from Figure 1 that the information acquisition structure under the three-dimensional imaging technology abandons the shortcomings of the traditional method, which have low utilization of each component of the target object and insufficient acquisition angles. At the same time, the imaging image acquisition device not only collects visual information in the vertical direction of the optical axis but also covers the central area of the optical axis with an acquisition camera. In the specific operation process, the acquisition device moves unidirectionally along the optimal direction with a fixed angle from the optical axis, which makes the entire acquisition process simpler than the traditional method and improves the acquisition efficiency [11].

After the acquisition of imaging image information is completed, data processing and structural reconstruction of the acquired 3D imaging information are also required, which is an important step in expressing virtual reality of 3D actual objects in reality. There are two main application methods for 3D reconstruction, namely, 3D reconstruction based on RGB-D depth camera and depth estimation and structure reconstruction based on deep learning. Since the imaging image operation process proposed in this paper mainly uses the technology in the field of deep-level information processing, this paper adopts the computer three-dimensional reconstruction method for processing, and the specific process is shown in Figure 2.

In the three-dimensional reconstruction process shown in Figure 2, there are a total of n acquired element imaging images. The imaging image captured by the acquisition device with the farthest relative distance from the target object is used as the comparison image. Then, all the imaging images are mapped from the unreal aperture to the 3D virtual space by back-projection, and finally, the final 3D reconstructed imaging image is obtained by scaling, translation, and overlapping.

Finally, the reconstructed imaging images are visualized, and the corresponding 3D stereo images are displayed in real time. In the process of image display, it mainly performs operations such as retouching, cropping, line optimization, light and shadow effect processing, and zooming on the image. The scaling operation is one of the most important operation links. In this paper, the zoom function of the imaging image display part combines the principle of image zoom to optimize the overall visual effect of the image display. The specific principle is shown in Figure 3.

Figure 3 shows that the optimization method for the zoom operation in the imaging information display theory proposed in this paper based on the principle of image zoom is intuitive, simple, and effective. The reduced image based on the original imaging image is only reduced as a whole, and the proportion of three-dimensional objects in the entire image will not be changed. At the same time, the higher precision of the imaging image can also be guaranteed, and the operation principle of magnification is similar. The size is changed, but the scale will not change. Although the precision is relatively small, the visual communication effect will also be enhanced [12]. The two operations satisfy different needs, respectively, but the final display effect is obviously enhanced compared with the traditional display method.

3.2. Virtual Reality Technology. Virtual reality technology is an important research direction of emerging simulation technology in recent years. It is a comprehensive and efficient practical technology that combines a variety of technologies. The specific structure is shown in Figure 4.

As can be seen from Figure 4, the virtual reality technology is formed by the combination of seven technologies. Among them, three-dimensional computer graphics technology and wide-angle stereoscopic display technology are very suitable for the imaging image processing system of this paper. The following is a specific introduction to the virtual reality technology algorithm [13, 14]. In the design of 5G network virtual reality technology, Formula (1) specifies the direction setting of the action space. C_1 indicates that there are closely associated conversion types in all objects in the specified declaration. The weights of directed action sequences reflect the enormous diversity of data products in the statement:

$$N_{tn} = 1 - \sum \frac{(2\gamma_m \gamma_t + C_1)(2\varphi_{mt} + C_2)}{(\gamma_m^2 + \gamma_t^2 + C_1)(\varphi_m^2 + \varphi_t^2 + C_2)}. \tag{1}$$

The impact of g_i performance is described by introducing artificial intelligence modeling techniques. The relevant code elements are shown in the following formulas:

$$K(g_i, l_h) = K(g_i) K\left(\frac{l_h}{g_i}\right),$$

$$K\left(\frac{l_h}{g_i}\right) = \sum_{p=1}^{p} K\left(\frac{l_h}{w_p}\right) K\left(\frac{w_p}{g_i}\right), \tag{2}$$

$$k_p = \sum \frac{2p}{p+1} + \left[\frac{1}{2} + \frac{1}{2p}\right]\left[\frac{c_2 - c_1}{3}\right]^2 + \frac{2(c_2 - c_1)}{3}. \tag{3}$$

In order to achieve the effect of $c_2 - c_1$ evolution from rule formulation to actual implementation of specific virtual reality technology [15], the static analyzer method can be used for specific analysis and processes:

$$C_{ha} = \int_0^{\infty} g F_h(t) \int_0^{t} (t - m) g F_a(m). \tag{4}$$

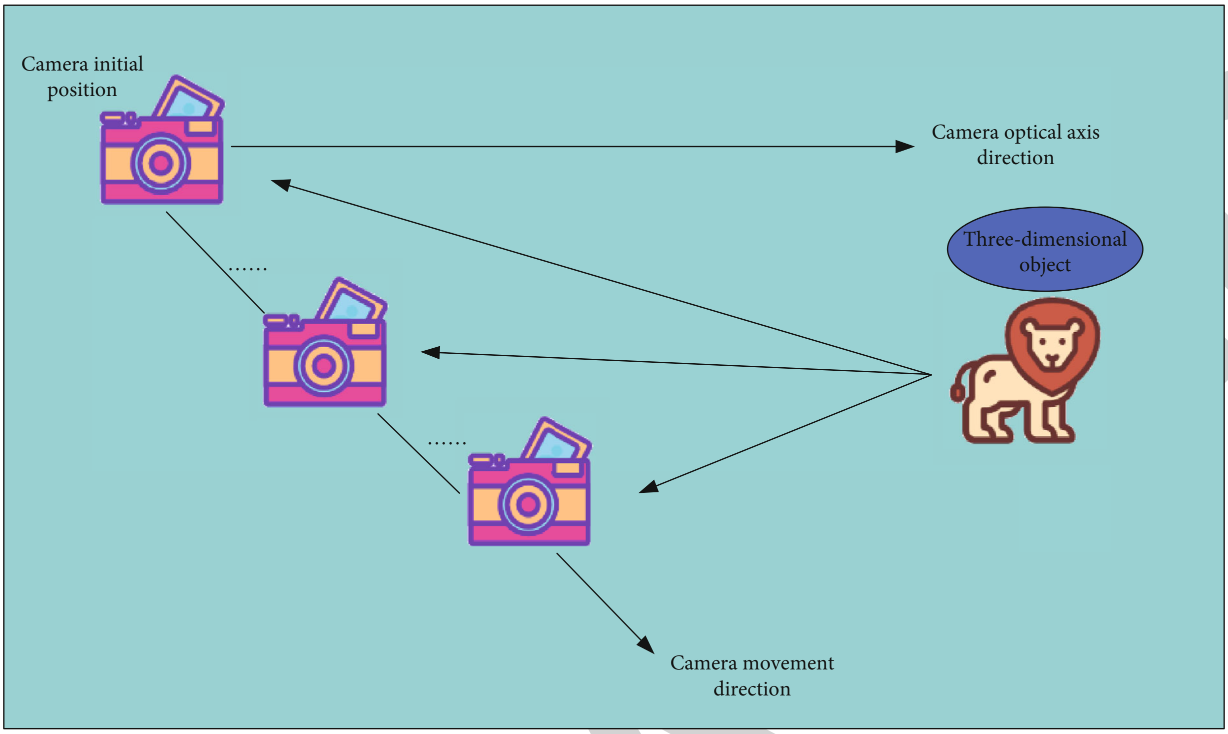

Figure 1: Imaging information acquisition structure under 3D imaging technology.

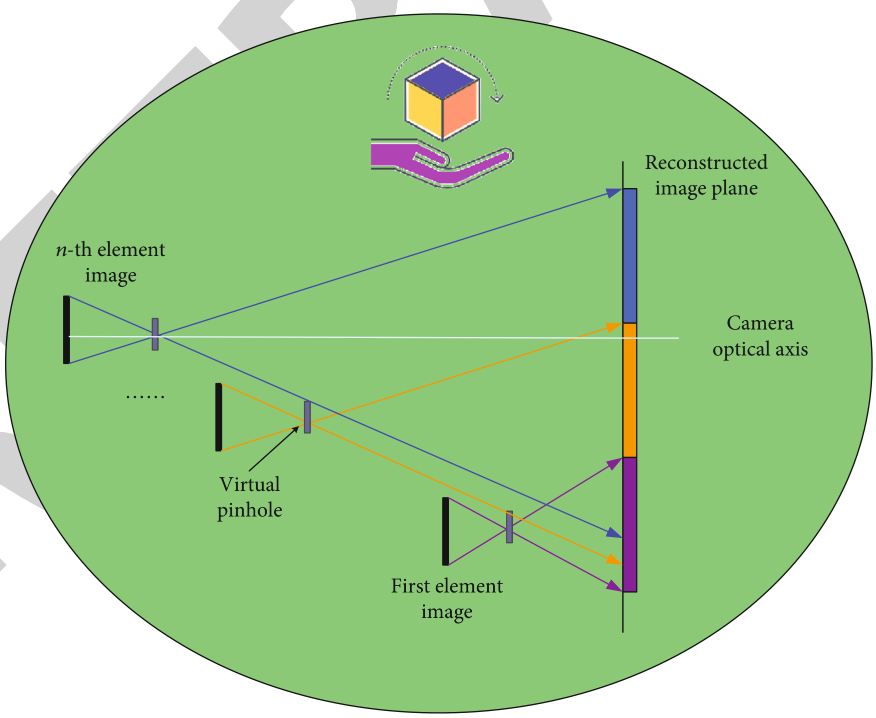

Figure 2: 3D reconstruction process of imaging information acquisition.

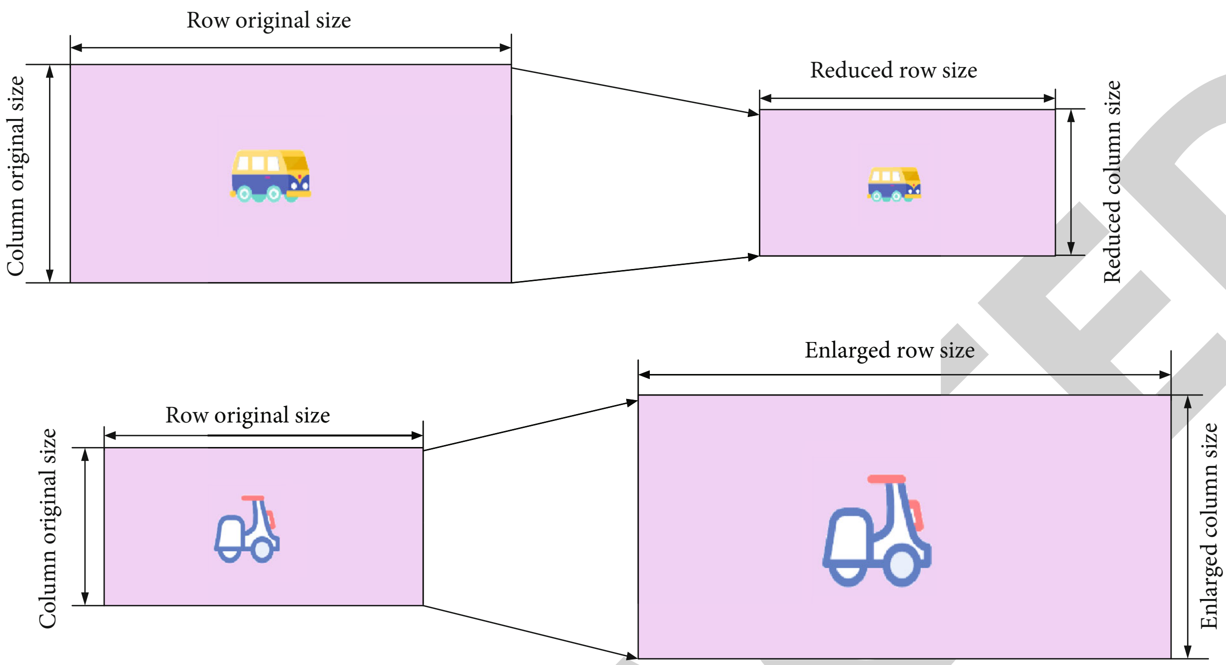

FIGURE 3: Principle of imaging information display.

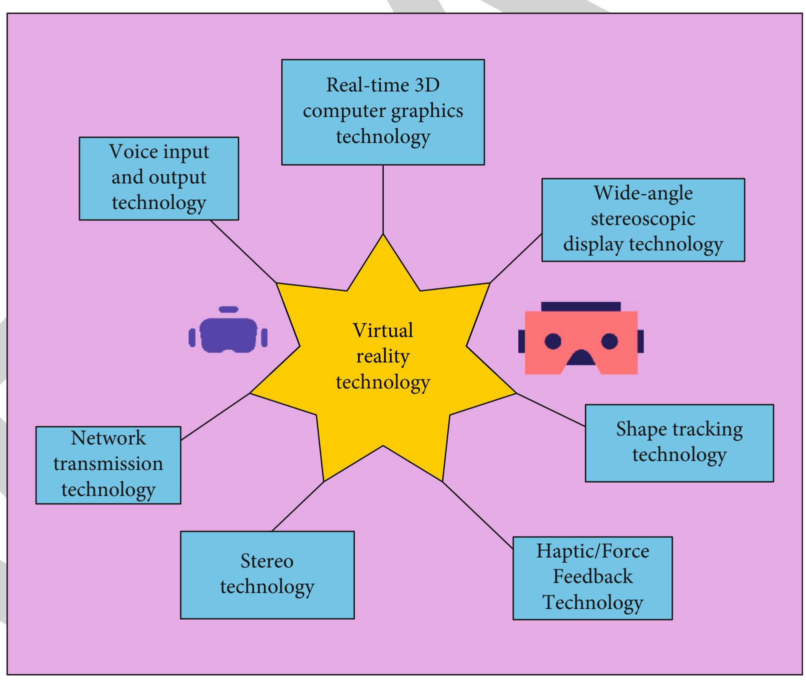

FIGURE 4: Composition of virtual reality technology.

As can be seen from Formula (4), in this process, the $t-m$ single-program report generates a set of data attributes used in the input process for its own behavior gF_h. This collection has been digested and processed accordingly. Finally, a digital signal object $C_{ha}s$ is formed:

$$\ln\left(\frac{N_{iv}}{N_{iv}-1}\right)=\beta+\chi\ln N_{iv}-1, \quad (5)$$

$$\sum_{m=1}^{\varepsilon} Xm\times k=\frac{\sum_{m=1}^{\varepsilon}\left(\left(L+Z_I/\sum_1^{y}L_\theta\right)/C+Z+Zc\right))}{\chi+\beta\ln N_{iv}+(K/C)}. \quad (6)$$

The technical information in Formula (6) is denoted by N_{iv}, the same set of audio data items $\beta+\chi$ is denoted by ε, and the series of digital signal objects is also denoted by L_θ. $Xm\times k$ is the claim granted by the input object k, which conforms to the process Z information and data objects. And according to the formula, the statement is expanded even if the data item u is equal to the process $\sum_{m=1}^{\varepsilon} Xm \times k$ output data object.

3.3. Convolutional Neural Network Optimization Virtual Reality Technology. In order to improve the accuracy and error control of the entire imaging information acquisition and display system, this paper introduces a convolutional neural network-related algorithm to optimize virtual reality technology [16, 17]. The specific derivation process of the algorithm is as follows. When the imaged image is input, the image data is input to the central area of the optical axis node. Therefore, the output value in the connection point in the input process is set to the same value as the input value. At the same time, the base station, which is an intermediate hub, plays an important role in the connection point in the output process. Only one of all base stations is selected as the active base station. And the transmission values of all the connection points of the base station of the intermediate hub will be sent to the base station and outputted by it.

The connection point in the input process is represented as $n_i, i = \{1, 2, \cdots, y\}$, and there are y experimental samples in total. Equation Formula (7) represents the input representation of the connection point G in the model:

$$G_h = \sum_{h=1}^{y} \eta_{ih} n_i. \tag{7}$$

The imaging image information obtained from the base station to the connection point is shown in Formula (8):

$$S_h = \sum_{h=1}^{y} \frac{1}{\left\{1 + \left[\left(\sum_{i=1}^{y} \eta_h S_h\right)^{-1} - 1\right]^2\right\}'} = \sum_{h=1}^{y} \frac{1}{\left[\left(G_h^{-1} - 1\right)^2\right]}. \tag{8}$$

Among them, η_h is used to represent the power required from the ground base station G_h^{-1} of the connection point with image information to the center position h of the connection point, and S_h represents the element information in the image.

The activation function also needs to be configured in the whole process, as shown in Formula (9):

$$T = \sum_{h=1}^{y} \frac{1}{\left\{1 + \left[\left(\sum_{i=1}^{y} \eta_h S_h\right)^{-1} - 1\right]^2\right\}^{2'}}. \tag{9}$$

In Formula (9), the cell in the output process contains S connection points. The optimal governing formula [18] for the image can be expressed as the mean of the squared error of the error, as shown in Formula (10):

$$R = \left(\frac{1}{N}\right) \sum_{n=1}^{y} [\bar{t} - t]^2 = \left(\frac{1}{N}\right) \sum_{n=1}^{y} R_h. \tag{10}$$

The introduction of convolutional neural networks into virtual reality technology will correspondingly change the σR framework. However, the relevant properties of the neural network can be modified to obtain the minimum value of ϕ. The function of σd_{ih} is to adjust the decoupling. Equation Formula (11) is the specific expression:

$$R_{ih} = \sum \begin{cases} \eta_{ih} = -\phi\left(\dfrac{\sigma R}{\sigma d_{ih}}\right), \\ \eta_h = -\phi\left(\dfrac{\sigma R}{\sigma \eta_{ih}}\right). \end{cases} \tag{11}$$

In addition, in the rate optimization of the imaging information acquisition and display process, the total number of $a_i \eta_h S_h^2$ optimization parameters between the neural network and the access points in the outer layer of the factor is shown by Formula (12):

$$\eta_{ih} = a_i \eta_h S_h^2 \left[1 - \sum_{i=1}^{y} \eta_{ih} a_h\right] \varepsilon_h. \tag{12}$$

Formula (13) represents the calculation method of the total number of connection optimization parameters [19]:

$$\eta_h = \sum_{h=1}^{s} t^2 S_h \left[1 - \sum_{h=1}^{s} \eta_h S_h\right] [\bar{t} - t]^2. \tag{13}$$

Among them, $\bar{t}$ and t belong to the variables of η_1, which are used to specify the maximum and minimum values of the variation range, respectively. Then, the optimized algorithm framework can be put into practical application. By selecting the $\sum_{h=1}^{s} \eta_h S_h$ improvement strategy of the neural network that meets the conditions of the system, the purpose of assigning the interactive weight of the algorithm framework is achieved. This process can also effectively improve the accuracy of the overall system. After combining the convolutional neural network technology with the algorithm, the system will get higher performance. The specific strategies are as follows:

$$\min(R) = \sum_{h=1}^{s} \int \left(\eta_{1,} \cdots, \eta_y\right). \tag{14}$$

In Formula (14), $\min(R)$ represents the relative deviation value of the system, and $(\eta_{1,} \cdots, \eta_y)$ is the fixed weight after the strong joint numbering. It contains the connection points that store data during the input process and the weights of the endpoints that are affected. The connection points located in the central area of the model and the associated evaluation test model of the connection point module during export are also included. m is used to count the sum of the quantities of various parameters of the system [20].

The optimization algorithm is used to explore and solve the problem of insufficient storage capacity of the whole system. Since the coverage area of the algorithm model is approximately at the level of $\int(\eta_{1,} \cdots, \eta_y)$, it will be of great help to the whole system if the algorithm can be perfectly integrated into the system. Due to the strong correlation between the steps and methods when $W-R$ performs the optimization operation, Formula (15) can be used to express the training method with an intensity of $R<W$:

$$\int_i = \sum_{i=1} \begin{cases} W-R, R<W, \\ 0, R \geq W. \end{cases} \tag{15}$$

In Formula (15), R represents the accumulated value of all $R \geq U$ at this stage. In order to distinguish the parameter N_s in the optimization process to achieve the effect of satisfying the integration efficiency of $\int_1 (W-R)/W \in [0, 0.5]$, and at the same time, the reduction of the integration efficiency caused by the decryption operation can be minimized as much as possible, and this paper uses the following formula for further derivation:

$$N_s = \left\{ 2\left(\frac{\int_1 W - RR < W}{W}\right), \frac{\int_1 (W-R)}{W} \in [0, 0.5]. \right. \tag{16}$$

In order to transform into a dimensionless expression through the correlation operation pair $\int_1 (W-R)/W \in [0.5, 1]$, this paper will use a max-minimization technique that can efficiently process information. The advantage is that it can keep the original state of the target object unchanged. At the same time, the occurrence of data duplication can be effectively avoided. In this regard, the normalization formula of the data in the input process proposed in this paper is

$$N_s = \left[1 - 2(1 - \left(\frac{\int_1 W - RR < W}{W}\right)^2\right], \frac{\int_1 (W-R)}{W} \in [0.5, 1]. \tag{17}$$

By reducing all the key information in the algorithm model to a representation range of only $[0, 1]$, the method is defined as normalization $\int_1 (W-R)/W \in [0.5, 1]s$, and its solution is expressed as follows:

$$a' = \sum_{i=1}^{y} \frac{a - a_{\min}}{a_{\max} - a_{\min}} + \frac{\int_1 (W-R)}{W} \in [0.5, 1]. \tag{18}$$

The function of the normalization process λ is to convert the information with specification errors in the target data set into random values between $[0, 1]$. Formula (19) is an elaboration of the specific conversion process:

$$a' = \sum_{i=1}^{y} \frac{a - \overline{a_{\min}}}{\lambda} + a_{\max} - a_{\min}. \tag{19}$$

Each site is composed of three layers: a connection layer that represents the operation of the input process, a connection layer that stores hidden information, and a connection layer that is used for convolution operations. The weights of the three layers are defined as χ, μ, and β, respectively, and the relational expression is shown in Formula (20):

$$\chi_z^k = \sum_{i=1}^{N} \eta_{iz} a_i^k + \sum_{z'}^{N} \eta_{z'z} p_{z'}. \tag{20}$$

If the transmission task is completed for each data, $\eta_{z'z}$ $p_{z'}^{k-1}$ work will continue to be performed in the receiver of the entire system. Then, only by entering 111, the next nerve cell can continue to operate as a new transmission information system. This will also affect the parameter values of the subsequent input process as follows:

$$\beta_{z'}^{k-1} = \sum_{k \longrightarrow 1}^{z} \eta_z \left(p_{z'}^{k-1}\right) + \eta_{z'z} p_{z'}^{k-1}. \tag{21}$$

For all neurons existing in the input process, the original information of the connection layer unit that stores the hidden information and the output variable of the unit existing in the output process at time step k are shown in Formula (22):

$$\mu_{z'}^{k-1} = \sum_{z=1}^{N} \eta_{z0} p_z^k + \eta_z \left(p_{z'}^{k-1}\right). \tag{22}$$

Virtual reality technology is accelerating its penetration into production and life. In the production field, it is mainly used in the R&D and design of new products to reduce R&D costs and shorten the R&D cycle. Therefore, it is necessary to study the optimized virtual reality technology.

4. Application of Virtual Reality Technology to Imaging Information Collection and Display System

4.1. Application of Imaging Information Acquisition and Display System. In order to verify the visual communication effect of the proposed imaging information acquisition and display system, this paper will take two methods of questionnaire survey and simulation experiment to comprehensively investigate the feasibility and professionalism of the system. This paper interviews four professionals in the field of visual communication technology design. The structure and composition of each part of the imaging information acquisition and display system and the specific realization results are shown. After that, a corresponding questionnaire survey is conducted to explore the construction effect of the system proposed in this paper from the perspective of professional designers. The survey results are shown in Table 1.

In Table 1, each professional scored each section on a scale of 0 to 5. It can be seen that the four professionals have a good overall impression of the imaging information acquisition and display system in this paper. The highest score is the design of the system information collection part and the system algorithm design, with an average score of 4.75 points. The lowest score was in the imaging information

Table 1: Comprehensive evaluation of the system by professionals.

Evaluation angle	Evaluator				Mean
	P1	P2	P3	P4	
Design effect of information collection part	5	4	5	5	4.75
Information display part of the design effect	4	5	4	4	4.25
System algorithm design	5	5	5	4	4.75
System overall structure design	5	5	4	4	4.5

display section, with an average score of 4.25. Although the score is acceptable, compared with other designs, there are still some details in this part that need to be refined.

In addition, this paper also selects 50 experimental volunteers who are quite interested in visual communication design or take it as a hobby. The 50 people spend a month familiarizing themselves with and using the system in their daily lives. The purpose is to contrast with the views of professionals. The feasibility and practicability of the imaging information acquisition and display system designed in this paper are investigated from the perspective of ordinary people. One month later, the 50 people are given a satisfaction survey. The questions in the questionnaire are all related to the design of the system in this paper. Each person can evaluate the question. The scoring interval is 0 – 10 points. The higher the score, the higher the satisfaction with the question. The final questionnaire results are shown in Table 2.

It can be seen from the results in Table 2 that the overall satisfaction of the 50 volunteers in the study is good with the imaging information acquisition and display system proposed in this paper. The average satisfaction score of the 5 questions is above 8.7 points, of which the highest average score is 9 points and the lowest is 8.76 points. And none of the 50 volunteers scored below 6 on each of the 5 questions. This shows that the overall performance of the system is excellent in all angles.

In addition, this paper compares and analyzes the performance of the original designed imaging information acquisition and display system and the currently widely used traditional system. The advantages and disadvantages of the system in the simulation environment compared to the traditional system are explored. The simulation test is carried out for the important imaging image stitching effect in the whole imaging process. Imaging image stitching is the intermediate stage of information acquisition and imaging display. The implementation effect of this stage can determine the degree of absorption of the results of the previous stage and the degree of completion of the final presentation results. In this paper, a group of data that has gone through the imaging information acquisition stage is selected as the experimental sample. The above two methods are used to test the time-consuming condition of this sample 8 times, respectively. The test results are shown in Table 3.

It can be seen from Table 3 that the two methods are not ideal in the processing speed of the imaging image stitching stage, and the time required to complete the entire stage is more than 5800 ms. However, the information acquisition and display system proposed in this paper is significantly better than the traditional system in a total of 8 test time consumption. The time consumption of each test is reduced by more than 28% in comparison, with an average reduction rate of 30.8%.

In view of the relatively slow processing speed in the image stage, this paper appropriately reduces the testing range of the entire imaging image. Whether the time required for stitching of imaged images can be reduced under such optimized conditions is explored. Table 4 shows the specific data enumeration.

From the data in Table 4, it can be seen that after the range of the image to be tested is appropriately reduced, the time consumption of the two systems in the imaging image stitching stage is greatly shortened. The average consumption time of the traditional system is reduced from 8534.45 ms to 1926.88 ms. The average consumption time of the system proposed in this paper also has an optimization difference of 4606.42 ms, and in terms of the average reduction rate, the time consumption of the system designed in this paper is reduced by 32.1% compared with the traditional system after using the above improved method. This also proves the time-consuming advantage of the imaging data acquisition and display system designed in this paper.

In order to detect the final imaging effect of the imaging information acquisition and display system, this paper selects the human body structure as the experimental object. The image rendering level of the human body under the system environment of this paper is explored, as shown in Figure 5.

It can be seen from Figure 5 that in the final display effect, the display completion of the entire human body is close to perfect. At the same time, the imaging image is clear. The light and shadow handling is also done just right. The presented portrait is very close to the actual collection scene, and the degree of restoration is very high.

4.2. Application of Virtual Reality Technology. In order to verify the overall performance optimization effect of the system using virtual reality technology, this paper compares the relative error performance of the system with the real operating environment without virtual reality technology. In this paper, a total of 1000 imaging image information samples are selected as experimental objects, and the samples are applied in these two environments, respectively. At the same time, in order to improve the accuracy of the data, this paper will conduct two comparative experiments under the same experimental conditions, and the final results are shown in Figure 6.

It can be seen from Figure 6 that in the two comparisons of relative errors under the same conditions, the relative error control performance in the environment using virtual

Table 2: System satisfaction survey results.

Question	Score						Mean
	10	9	8	7	6	<6	
Q1	18	13	12	5	2	0	8.8
Q2	21	11	14	2	2	0	8.94
Q3	17	16	10	6	1	0	8.84
Q4	18	14	8	8	2	0	8.76
Q5	23	12	7	8	0	0	9

Table 3: Time consumption comparison of the two systems.

Number of tests	Time consuming		Reduction rate
	Legacy system (ms)	Optimized system (ms)	
1	8699.5	5820.6	33.1%
2	8455.3	5962	29.5%
3	8416.9	5643.1	33.0%
4	8523.6	5933.6	30.4%
5	8551.7	6121.4	28.4%
6	8449.3	6002.9	30.0%
7	8632.9	5952.4	31.0%
8	8546.4	5883.4	31.2%
Mean	8534.45	5914.93	30.8%

Table 4: Time consumption comparison of the two systems after the improved strategy.

Number of tests	Time consuming		Reduction rate
	Legacy system (ms)	Optimized system (ms)	
1	1865.9	1362.5	27.0%
2	1882.4	1259.6	33.1%
3	1933.6	1296.3	33.0%
4	1946.5	1299.3	33.2%
5	1889.1	1316.5	30.3%
6	1886.3	1278.2	32.2%
7	2013.6	1377.3	31.6%
8	1997.6	1278.4	36.0%
Mean	1926.88	1308.51	32.1%

reality technology is significantly better. The highest relative error is only 1.44, and the lowest is an excellent error control level of 0.18.

4.3. Optimized Application of Virtual Reality Technology. This paper tests the main performance of virtual reality technology optimized by convolutional neural network-related technologies. This paper compares the performance of this algorithm with three commonly used algorithms applied to the imaging image processing systems under the same experimental conditions. High precision has always been the key standard of imaging image processing, so this paper first selects relevant samples to test the accuracy of imaging

Figure 5: Human body imaging display effect.

image processing. In order to ensure the feasibility of the experiment, this paper divides the samples into test samples and training samples on average. Among them, the requirements of various indicators in the experimental environment of the training samples are more stringent. The final accuracy data of the two samples are shown in Figure 7.

It can be clearly seen from Figure 7 that the optimized virtual reality technology proposed in this paper has absolute advantages in both sample accuracies. Among them, the training accuracy is reached an extremely high-precision level of 99.3%, and the test sample accuracy is also reached the level of 97.9%; in contrast, the other three algorithms do not achieve a very good level of accuracy on the imaged images. The highest accuracy values of the random forest algorithm, KNN, and NNGA algorithms are 84%, 87.5%, and 77.3%, respectively.

After testing the precision comparison, this paper also selects another important analysis indicator for testing, that is, the recall rate. The processed imaging image samples are also divided into test and training samples. Other factors in the experimental environment are also unchanged. The specific recall performance of the four algorithms is shown as follows.

Figure 8 shows the different recall performance of two experimental samples of the four algorithms. The recall rates of the optimized virtual reality technology training samples and test samples proposed in this paper are 0.85% and 0.83%, respectively. Compared with the average recall rate of the KNN algorithm of two samples of 1.93% and the average recall rate of NNGA of 2.33%, the algorithm in this paper is in a backward position in terms of recall rate. Although this is a normal phenomenon in the pursuit of higher accuracy, it also reflects the improvement space of the algorithm in this paper in terms of recall optimization.

In addition, in order to make an intuitive comparison between the virtual reality technology optimized by the convolutional neural network algorithm and the unoptimized technology, this paper selects 2000 imaging image samples and also conducts two comparison experiments under the same conditions. The actual performance of the two VR technologies is tested, and the performance of the two technologies is compared according to the tested error data. The experimental data is shown in Figure 9.

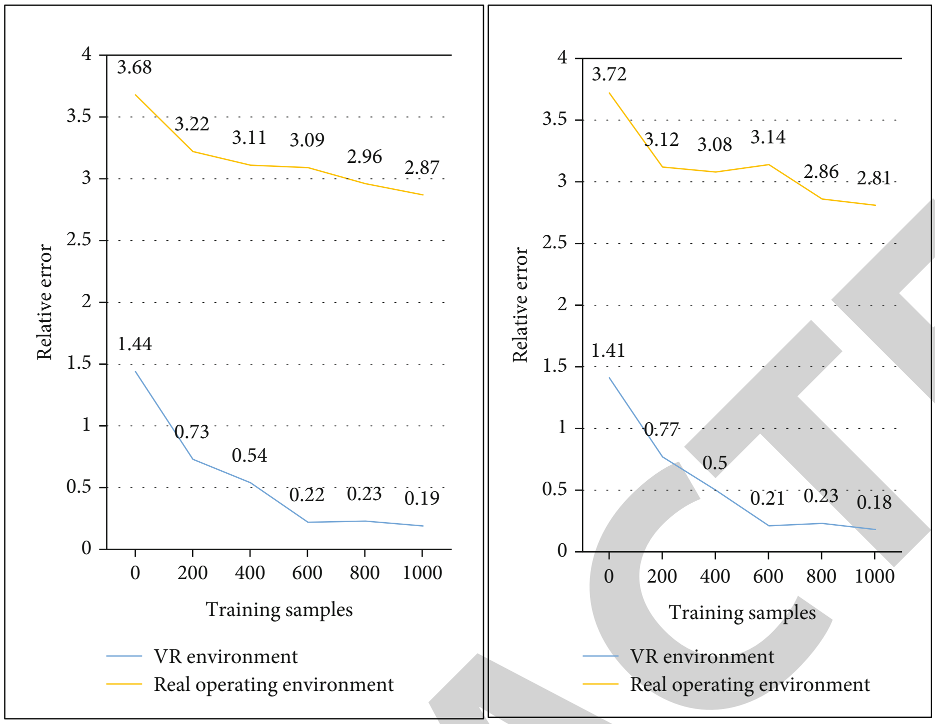

Figure 6: Comparison of relative errors in two operating environments.

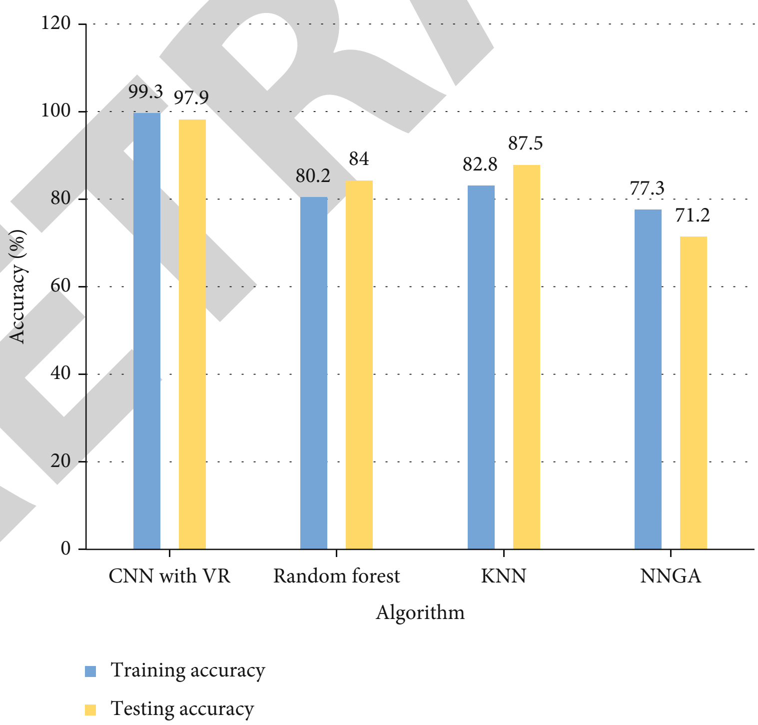

Figure 7: Accuracy comparison of the four algorithms.

In the error performance of the two experiments in Figure 9, the optimized VR technology leads the whole stage in terms of mean square error. Among them, after testing 400 samples in the two experiments, the error performance is controlled below 0.32, and the best error control performance is 0.07; the unoptimized virtual reality technology error control is not ideal. The minimum error failed to break below 0.2.

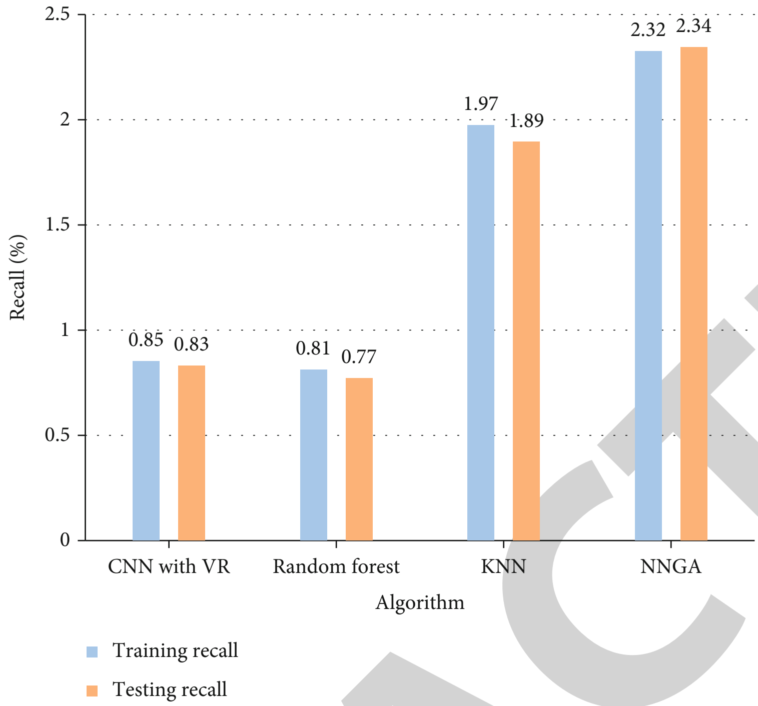

Figure 8: Comparison of recall rates of the four algorithms.

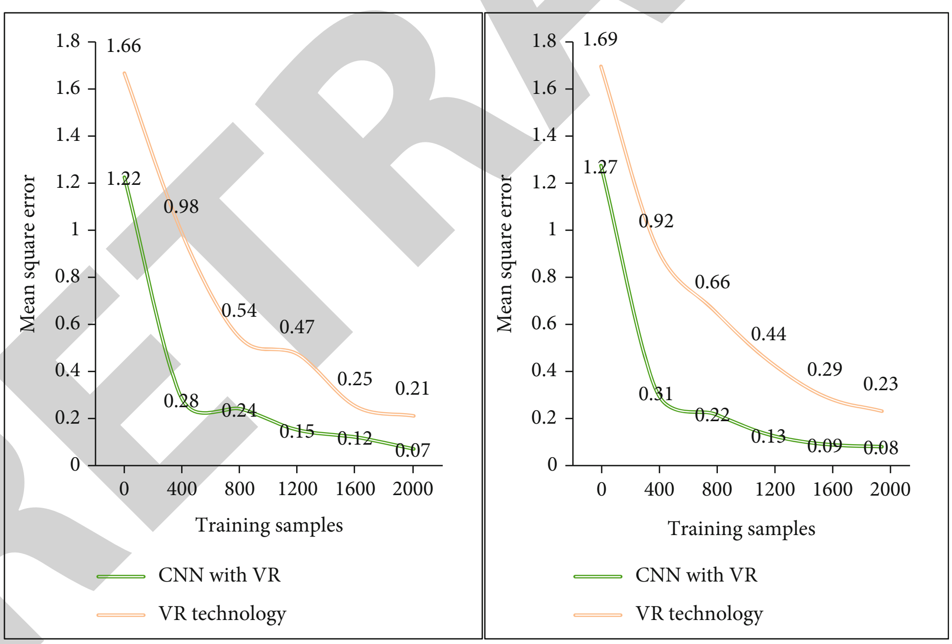

Figure 9: Two comparisons of the error performance of the two algorithms.

5. Conclusions

The advantages of digital image processing are high processing accuracy, rich processing content, complex nonlinear processing, and flexible adaptability. Generally speaking, the content can be processed only by changing the software; so, it is widely used. How to design an imaging image processing system to show stunning visual communication effects on the three-dimensional appearance of actual objects and at the same time expand the extension of contemporary visual communication design, this has always been a problem that relevant designers are eagerly concerned about and researched. This paper provided a critical review of traditional imaging image acquisition devices and techniques. The use of 3D imaging technology to construct a very efficient acquisition process was proposed. Computer 3D reconstruction methods were used to perform key reconstruction operations on the acquired imaging images.

Professional image display technology was used to achieve realistic visual communication effects. In addition, this paper optimized the virtual vision technology by introducing the convolutional neural network algorithm, and the recall rates of the optimized VR training samples and test samples are 0.85% and 0.83%, respectively. The optimized algorithm model could provide strong technical support for the entire system. While the accuracy was greatly improved, the experimental error was reduced. This undoubtedly promoted the rapid development of imaging image information acquisition and display systems. And in the course of digital media technology, the abovementioned technologies can be used to construct three-dimensional images, outline vivid virtual information images, and greatly enhance the dynamic and comprehensive effects of visual communication design.

Data Availability

Data sharing is not applicable to this article as no datasets were generated or analyzed during the current study.

Conflicts of Interest

The authors declare that there is no conflict of interest with any financial organizations regarding the material reported in this manuscript.

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