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Retraction

Retracted: Application of Image Processing Variation Model Based on Network Control Robot Image Transmission and Processing System in Multimedia Enhancement Technology

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This article has been retracted by Hindawi following an investigation undertaken by the publisher [1].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) Manipulated or compromised peer review

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. Wu and J. Qi, "Application of Image Processing Variation Model Based on Network Control Robot Image Transmission and Processing System in Multimedia Enhancement Technology," *Journal of Robotics*, vol. 2022, Article ID 6991983, 10 pages, 2022.

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Research Article

Application of Image Processing Variation Model Based on Network Control Robot Image Transmission and Processing System in Multimedia Enhancement Technology

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The rapid development of the information age brings convenience to human life, but it also brings great challenges to information processing technology. Multimedia enhancement technology is an organic combination of multimedia technology and information processing technology, and it is also an important way of modern multimedia image information processing. However, its usefulness and effectiveness are increasingly negatively affected by the open information environment. The processing effect is also unable to meet the development requirements of the visual field. In order to improve this problem, this paper studied the image transmission and processing system of network-controlled robot on the basis of analyzing the characteristics of the problems existing in the current stage of multimedia technology. On this basis, a new image processing variational model was established and applied to multimedia enhancement technology, which improved the efficiency and effect of image information processing. Finally, the feasibility of its application function and performance was tested by experiments. The test results showed that in the difficult mode of the image processing task, the refresh time of the model in this paper in the multimedia enhancement technology was 1.13 s in total, which was not much different from the test results in the easy mode. Also, in the load stress test, the comprehensive test values under full-function operation and partial-function operation were 42.04% and 20.92%, respectively. Compared with the traditional model, the model in this paper has stronger carrying capacity in multimedia enhancement technology and has better processing ability and stability.

1. Introduction

With the maturity of Internet technology and the widespread use of mobile communications, the image information used and circulated in the online environment has shown a rapid development trend. As an important support for image information processing, multimedia enhancement technology can effectively process various types of multimedia information, such as text, data, video, and voice. However, in the whole complex communication network environment, image information has strong redundancy. All kinds of image content, whether in the process of storage, transmission, or in the process of secondary analysis, have brought great challenges to the current multimedia enhancement technology. When there is a lot of complicated and dazzling multimedia image information, how to compress it to reduce the transmission amount and improve the transmission and processing efficiency on the basis of retaining the effective information is a problem that needs to be solved by the current multimedia enhancement technology. In the context of the dual development of control technology and computer network, network-controlled robots have been maturely applied. Also, its image transmission and processing system ensures the convenience and reliability of image processing. The image processing variational model established under this system can ensure that the key information of the image is not lost. The reliability and authenticity of the image are improved, which is of great significance for improving the practical application value of multimedia enhancement technology.

As an important means of comprehensive processing of media information, multimedia enhancement technology has always been the research direction of many scholars. Jan et al. proposed a histogram-based energy saving algorithm to improve the resolution and image quality of modern multimedia devices [1]. Zhang and Huo proposed a multimedia enhancement technique with quantum chaotic graph, which encrypted the image and improved the reliability and security of multimedia images [2]. To achieve the best multimedia enhancement layer compression efficiency, Hoangvan et al. proposed a novel HEVC-based framework with high-quality scalability [3]. Ahmed et al. proposed a method for multisaliency enhancement for multimedia image location estimation, which was mainly performed by mean-shift clustering of visual words and saliency maps of images [4]. Ravisankar et al. used multiresolution sharpened images for reconstruction enhancement. Also, it was proved by performance measurement that this unsharp masking method outperformed other enhancement techniques [5]. Heindel et al. proposed a lossy-to-lossless scalable multimedia coding system. Scalability was achieved using lossy base layers combined with lossless compression of reconstruction errors in enhancement layers [6]. The development of image processing requires a higher level of multimedia enhancement technology, and the previous research methods are still lacking in efficiency. The image processing variational model based on the network control robot image transmission and processing system can play a strong advantage in its application.

At present, the variational model in the network-controlled robot image transmission and processing system has been widely used in many fields. Zhang et al. used a variational model for network-controlled robotic image processing in the linearization enhancement of elastic image denoising models. Simple complexity analysis was also performed [7]. Sridevi and Srinivas Kumar efficiently characterized intensity changes in images using a robust image processing variational model based on fractional nonlinear diffusion driven by differential curvature of the image processing system [8]. Feng proposed a new variational model under a network-controlled robot image transmission and processing system, which was used for anti-noise document image binarization. Also, the noise and illumination robustness of the method was verified [9]. Li and Yang proposed adaptive variational functionals for image inpainting, which demonstrated a stable variational scheme based on image processing systems. The existence and uniqueness of minimizing functional solutions were also investigated [10]. Combining the advantages of recently developed robotic image transmission and processing systems, Liu proposed a new variational model for solving the challenging problem of cartoon texture image decomposition [11]. To maximize adaptability, Suwanwimolkul et al. proposed a new sparse signal estimation for robotic imaging systems. Among them, noise and signal parameter estimation were unified into a variational optimization problem [12]. The image processing variational model of the network-controlled robot image transmission and processing system has high practicability. However, the application in multimedia enhancement technology has not been effectively applied. In order to enhance the application value of image processing variational model in multimedia enhancement technology and realize two-way development, its application research is very important.

Based on the network-controlled robot image transmission and processing system, this paper constructed a new image processing variational model, which was applied to the multimedia enhancement technology. Through the application test, it can be seen that the image processing function of the model in this paper was ideal. The total refresh time in mode 1 was 0.9 s, and the refresh time in mode 4 was 1.13 s. In the performance test, the variational model in this paper had better spatial adaptability. The memory usage had been stable in the range of 38.4%, and the CPU usage had only fluctuated in the range of 6.9%. In the load capacity test, the comprehensive value of the model under the full-function operation of multimedia enhancement technology was 42.04%, while the comprehensive value of the test under partial-function operation was 20.92%. The load capacity of the model is lower than that of the traditional model, but the load capacity is higher. From this point of view, the model constructed in this paper had ideal practicability in the application of multimedia enhancement technology.

2. Application of Image Processing Variation Model

2.1. Multimedia Enhancement Technology. Multimedia enhancement technology is an emerging technology developed on the basis of the original multimedia technology. It can be regarded as a small embedded technology system integrating hardware and software [13]. This technology requires the codesign of software and hardware, so that the hardware and software components can be divided reasonably. In multimedia enhancement techniques, nodes can be distributed in or around a perceptual image object in a number of different ways, such as random distribution and artificial positioning. These nodes form technology networks, often through self-organization. In terms of network functions, each node not only takes on the dual roles of terminal and router of traditional multimedia network nodes but also performs image data acquisition, storage, management, and fusion [14]. In special cases, it is also necessary to cooperate with other nodes. The sink node not only needs to have the function of controlling other devices but also needs to have the functions of establishing a routing table for routing selection, information forwarding, data fusion, and storing image information of other nodes. Its technical framework is shown in Figure 1.

A large number of nodes are distributed in or around the monitoring area in Figure 1. These nodes consist of self-organizing forms. The data monitored by the technology node are passed adjacently on other nodes. During

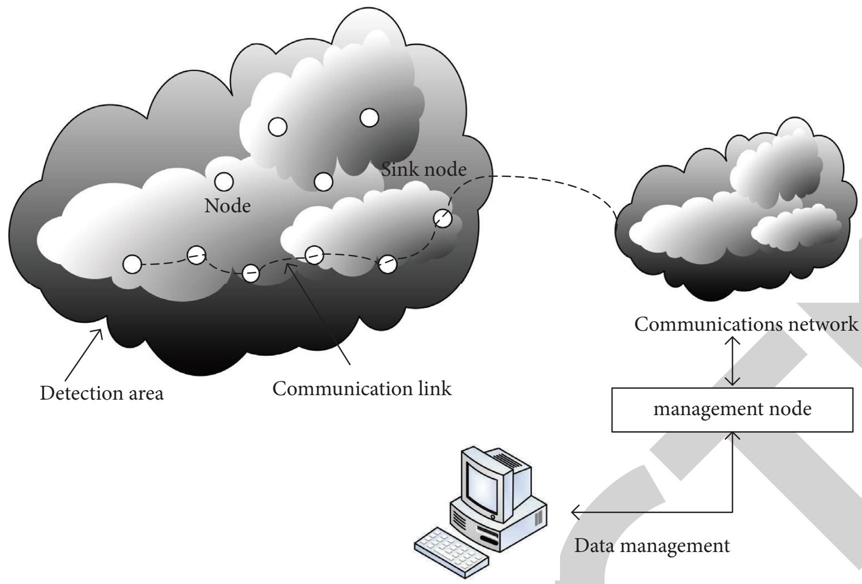


Figure 1: Multimedia enhancement technology framework.

transmission, the image data are simultaneously enhanced by multiple nodes and then returned to the summary point (sink node) through multiple hops. After processing, they are finally transmitted to the management node [15]. The multimedia enhancement technology mainly uses management nodes to enhance and control image information.

Image information processing plays a very important role in multimedia enhancement technology. However, with the increasing amount and variety of image data, its functions face huge challenges.

(1) There are effects of energy consumption and communication delays. Multimedia enhancement techniques need to take into account the excess energy consumed by excess runtime. Therefore, people have developed a method of hibernation. However, even with this method, there is no guarantee that the consumption is reduced.

(2) There is no fixed time for information transmission of multimedia enhancement technology. Without a fixed time requirement, multiple kinds of data are transmitted at the same time, which makes it difficult for the information receiver to process so much information at the first time.

(3) It is impossible to handle the performance standards at the same time. The main difficulty is the confusion of the dormancy mechanism, which makes the information transmission not timely. Nowadays, multimedia enhancement technology only considers the optimization of one performance index, while ignoring the optimization of other performance indicators at the same time.

The multimedia enhancement technology manages the relevant image information and data due to those competing nodes. Once it fails, it is difficult for other applications in the entire framework to continue to provide services. Therefore, it is very important to introduce the image processing variational model of the network-controlled robot image transmission and processing system to deal with the reduced transmission and processing of image data under the background that the nodes transmit information and resources cannot be used.

2.2. Variational Model of Image Processing. The network remote control robot is different from the traditional robot; it refers to the robot that can realize the remote operation under the network control. Its operating subject is generally a professional. In the control environment, professionals use position sensors, visual feedback, and other means to achieve remote network control of the system. The research on remote control has been in the exploratory stage since the beginning of the 1980s. It has flourished with the rise of computer network technology [16]. With the development of computer network, remote control is no longer restricted by geographical conditions. The emergence of the communication network reduces the communication cost, thereby improving the high cost problem caused by the design of dedicated connection lines in the traditional technology. Under the requirements of the development environment of the times, network-controlled robots have become an important direction in current robotics research.

The image transmission and processing system is the key system for the network control robot to realize the image task processing function. Generally, a camera equipped with a computer is used to take pictures of the outside scene. In the initial stage of the transmission of image data, the circuit is switched by the control signal. The differential signal is converted into a digital image signal in a standard format and then sent to the control unit for execution and processing. When the control unit realizes the processing function and the synchronization signal transmission function at the same time, the image data that has been initially processed is transmitted to the system memory for buffering, so as to prepare for the needs of subsequent work. By waiting for the system command to be sent, the image data are sent to the converter together with the control signal for conversion and converted into a specified analog quantity according to the command requirements. Finally, after the analog quantity is encoded and data are compressed, they are output through microwave. The hardware structure of the system is shown in Figure 2.

The exterior image captured by the camera is disturbed by noise in the process of formation and transmission. After the image data are transmitted in real time, in order to ensure the image quality during subsequent processing, the system needs to perform basic processing through the image processing variational model in the control module. Therefore, the image processing variational model mainly completes the overall control of the image, and the signal flowchart is shown in Figure 3.

The image processing of multimedia enhancement technology usually relies on software to complete. However, with the continuous development of computer technology, real-time processing and transmission of image data based on algorithmic models is a new research direction [17]. The model is based on a network-controlled robot image transmission and processing system, which realizes real-time processing of image data, and it has good feasibility. The image processing variational model is applied in the multimedia enhancement technology, which can greatly shorten the operation time of image processing, and it has a very good enhancement effect.

Therefore, this paper uses the image processing variational model to solve the image processing problem under the multimedia enhancement technology. The variational model consists of two steps: estimating the tangent vector field of the image and reconstructing the original image from the estimated tangent vector field and the blurred image. The application of variational model in multimedia enhancement technology is expounded from the discrete point of view.

First, the estimation of the tangent vector field in multimedia enhancement techniques needs to be considered. The image collected in the image transmission and processing system of the network-controlled robot is regarded as a two-dimensional surface defined on the area $\Omega = [1, N_1] \times [1, N_2]$. The parameter settings are shown in Table 1.

Among them, the normal vector and tangent vector of the image are denoted as $n = \nabla u = (D_1 u, D_2 u)^T$ and $t = \nabla^{\perp} u = (D_2 u - D_1 u)^T$. The difference operator is applied on both sides of the formula to obtain [18]

$$D_k u^* = D_k H u + D_k \varepsilon, \quad k = 1, 2, \tag{1}$$

where H is the block circulant matrix corresponding to h. Let $D_k u^* = v_k^* D_k u = v_k$, $D_k \varepsilon = \varepsilon_k$, and the operator is commutative in multimedia enhancement technology, so

$$v_k^* = H v_k + \varepsilon_k. \tag{2}$$

In this case, the additive noise ε_k satisfies $\varepsilon_k \sim N(0, \sigma^2, D_k D_k^T)$, resulting in

$$p(v_k^* | v_k) \sim N\left(v_k, \sigma^2, D_k D_k^T\right). \tag{3}$$

Let $t^* = (v_2^*, -v_1^*)^T = (t_1^*, t_2^*)^T$ and $t = (v_2, -v_1)^T = (t_1, t_2)^T$; then, there is

$$p(t^* | t) \sim \prod_k p(t_k^* | t_k), p(t_k^* | t_k) \sim N\left(H t_k, \sigma^2, D_{3-k} D_{3-k}^T\right). \tag{4}$$

It is assumed that the tangent vector field t of the image is piecewise smooth, so that the prior information of the total variation is adopted, namely,

$$p(t|\alpha) \propto \frac{1}{C_\alpha} e^{-\alpha} \int \Omega |\nabla t| \mathrm{d}x. \tag{5}$$

Among them:

$$|\nabla t|^2 = (D_1 t_1)^2 + (D_2 t_1)^2 + (D_1 t_2)^2 + (D_2 t_2)^2. \tag{6}$$

The estimation of t uses the maximum a posteriori estimation method, that is, maximization $p(t|t^*)$. It can be seen from the formula that $p(t|t^*) = p(t|t^*) p(t) / p(t^*)$. Therefore, maximizing $p(t|t^*)$ is equivalent to minimizing the log-likelihood function $-\log p(t|t^*)$, as shown in Figure 4.

The variational problem can be obtained by further derivation [19]:

$$\min_{\nabla \cdot t = 0} \int \Omega |\nabla t| \mathrm{d}x + \frac{\eta}{2} \sum_k \int \Omega \left(D_{3-k}^T (H t_k - t_k^*)\right)^2 \mathrm{d}x. \tag{7}$$

Among them, incompatibility condition $\nabla \cdot t = 0$ is used, and $\eta = \sigma^2 / \alpha$.

It is noted that the difference operator appears in the second term of formula (7). Therefore, formula (7) itself is in the form of a variational model, which is more reasonable for the estimation of tangent vector fields. However, due to the existence of the first-order difference operator D_k, the solution of the variational problem is not unique, and the solutions differ by a constant. Since $\varepsilon_k \sim N(0, \sigma^2, D_k D_k^T)$, there is $E(v_k^*) = H v_k$ according to the formula. Therefore, additional constraints can be added to the tangent vector field t, resulting in the following minimization problem:

$$\min_{t \in U} \int \Omega |\nabla t| \mathrm{d}x + \frac{\eta}{2} \sum_k \int \Omega \left(D_{3-k}^T (H t_k - t_k^*)\right)^2 \mathrm{d}x. \tag{8}$$

Among them, the function space $U = \left\{ t | \nabla \cdot t = 0, \int \Omega H t_k = \int \Omega t_k^* \right\}$. Unlike formula (7), it can be proved that when H is injective, the solution to the variational problem is unique, so formula (7) is used to estimate the tangent vector field t.

The distance of l_1 between the unit image gradient and the estimated unit normal vector field is used as the regularization term, resulting in the minimization problem of image restoration [20]:

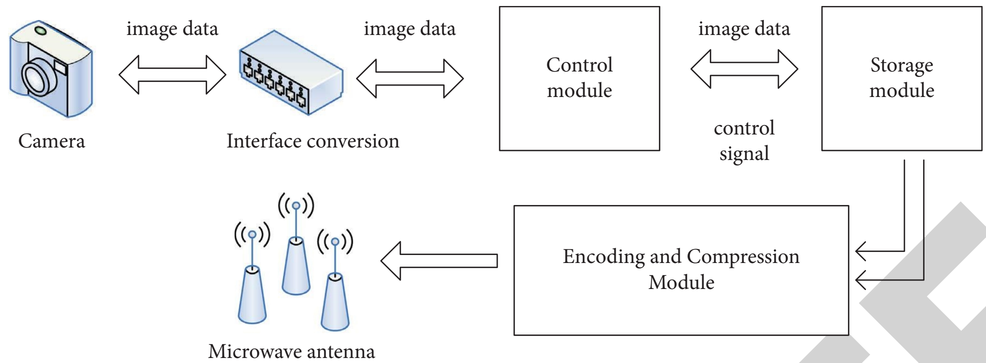


Figure 2: Hardware structure of image transmission and processing system.

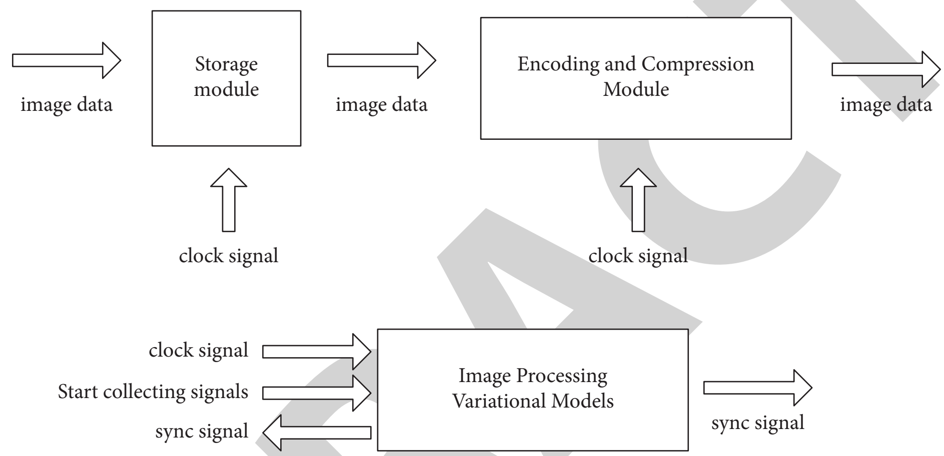


Figure 3: Signal flowchart.

Table 1: Parameter setting and its interpretation.

Sequence	Parameter setting	Meaning
1	D_1	First-order difference operator in the horizontal direction
2	D_2	First-order difference operator in the vertical direction
3	n	The normal vector of the image
4	t	Tangent vector of the image

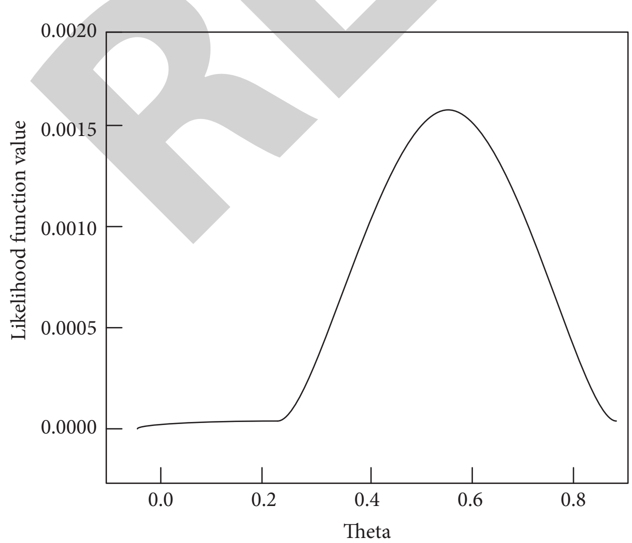


Figure 4: Maximum a posteriori estimation legend.

$$\min_u \int \Omega\left|\frac{\nabla u}{|\nabla u|} - \frac{n}{|n|}\right| dx + \frac{\lambda}{2}\int \Omega\left(Hu - u^*\right)^2 dx. \tag{9}$$

The regular term in formula (9) can be expressed as

$$\int \Omega\left|\frac{\nabla u}{|\nabla u|} - \frac{n}{|n|}\right| dx = \int \Omega\sqrt{2 - 2\frac{\nabla u \cdot n}{|\nabla u||n|}} dx = \int \Omega\sqrt{2 - 2\cos\theta}\, dx. \tag{10}$$

It can be seen that it is also only directionally matched. However, problem (9) is still nonconvex. Therefore, the following iterative formula is introduced to approximate this problem [21]:

$$u^{k+1} = \arg\min_u \int \Omega\left|\frac{\nabla u}{|\nabla u|} - \frac{n}{|n|}\right| dx + \frac{\lambda}{2}\int \Omega\left(Hu - u^*\right)^2 dx. \tag{11}$$

Formula (11) is a convex function. $w^k = 1/|\nabla u^k|$ is taken as the edge indicator function. When $|\nabla u^k| = 0$, w^k is a fixed constant; then, formula (11) is essentially a spatially adaptive image processing variational model. Compared with the traditional variational model, the model here can better preserve the details and texture information of the image. Therefore, compared with the previous regularization terms 8 and 9, the model proposed here has better performance in multimedia enhancement techniques.

Further analysis of this variational model shows that since incompatibility condition $\nabla \cdot t = 0$ is used in the first step, there is an image u_1 that satisfies

$$\nabla u_1 = n. \tag{12}$$

Assuming $|\nabla u^k| \approx |n|$, the right side of formula (12) can be expressed as

$$\begin{aligned}\min_u \int \Omega|\nabla u - n|\mathrm{d}x + \frac{\lambda}{2}\int \Omega\left(Hu - u^*\right)^2\mathrm{d}x &= \min_u \int \Omega w^k\left|\nabla u - \nabla u_1\right|\mathrm{d}x + \frac{\lambda}{2}\left(H\left(u - u_1\right) - \left(u^* - Hu_1\right)\right)^2 \\ &= \min_{u_2} \int \Omega w^k\left|\nabla u_2\right|\mathrm{d}x + \frac{\lambda}{2}\int \Omega\left(Hu_2 - f^*\right)^2\mathrm{d}x.\end{aligned} \tag{13}$$

Among them, $f^* = u^* - Hu_1$. The minimization value u_2 is obtained by formula (13); then, the restored image can be expressed as

$$u = u_1 + u_2. \tag{14}$$

Therefore, the proposed two-stage model can be explained as shown in Table 2.

The minimization problem of direction matching is extended to deblurring clarity, and its corresponding unconstrained problem can be expressed as

$$\min_u \int \Omega\left|\frac{\nabla u}{|\nabla u|} - \frac{n}{|n|}\right|^2\mathrm{d}x + \frac{\lambda}{2}\int \Omega\left(Hu - u^*\right)^2\mathrm{d}x. \tag{15}$$

A convex problem can also be obtained by linearizing it as in formula (11). Assuming $|\nabla u^k| \approx |n|$, according to formulas (12) and (13), the following minimization problem for u_2 can be similarly obtained:

$$\min_{u_2} \int \Omega w^k\left|\nabla u_2\right|^2\mathrm{d}x + \frac{\lambda}{2}\int \Omega\left(Hu_2 - f^*\right)^2\mathrm{d}x. \tag{16}$$

By observing formula (16), it is found that the minimization problem reduces to a weighted image variational processing model. Obviously, this model can better preserve the discontinuous information of images in the compression processing of multimedia enhancement technology and maintain higher data transmission quality and efficiency.

3. Application Testing

In order to verify the effectiveness of the image processing variational model based on the network-controlled robot image transmission and processing system in multimedia enhancement technology, this paper compares its application effect with the traditional image processing variational model in multimedia enhancement technology. The tests are carried out from these aspects, respectively, and the test environment is shown in Table 3.

From Table 3, the computer with Windows 11 operating system has corresponding mature interfaces and drivers and a lot of development experience to use. It also supports other data processing and system control software to facilitate the operation of the variational model of image processing. The Intel Core i7 chip and 8 GB memory can realize high-speed operation on a large amount of RGB image data and depth image data, which can meet the real-time requirements of the network control robot for the image acquisition and processing system. The USB 3.0 interface can meet the interface requirements of multimedia enhancement technology. Therefore, the test environment of this paper meets the test conditions.

3.1. Functional Test. In this paper, the application test of image processing variational model in multimedia enhancement technology includes two categories, namely, functional test and performance test. Functional testing is a necessary testing method. To ensure the effectiveness of the image processing variational model in multimedia enhancement technology, the first thing that needs to be ensured is its realization effect in the image processing function. This paper observes the task refresh time of the two types of models in multimedia enhancement technology under different task modes, and the results are shown in Figure 5.

The image processing function mainly analyzes the original and panoramic images through the variational model, which is convenient for the follow-up inspection of the multimedia enhancement technology program. The stored size is $512 \times 512 \times 2$ original 16 bit image and 14212×480 panorama image. The detection frequency is the same as the tracking frequency. The number and complexity of tasks that need to be processed in different modes of multimedia enhancement technology are also different. In general, the more tasks that are processed and the higher the complexity, the longer the refresh time is. A delay that is too different leads to a significant decrease in the functionality of the multimedia enhancement technology, resulting in a low degree of image processing. This article sets mode 1 as the easiest mode and mode 4 as the most complex mode. As can be seen from Figure 5(a), in mode 1, the detection refresh time of the image processing variational model in the

Table 2: Interpretation of the two-stage model.

Object	Model classification	Sequence	Effect
The proposed two-stage model	Variational processing models	1	Restore multimedia image u_1
		2	u_1 preserves the discontinuity of the image gradient information and the smooth areas of the image
	Weighted variational model	3	Restore multimedia image u_2
		4	u_2 preserves the discontinuous information of the image itself

Table 3: Experimental test environment.

Sequence	Equipment	Specification
1	Computer	Intel Core i7 RAM 8 GB
2	Operating system	Windows 11 64 bit
3	Interface	USB 3.0

multimedia enhancement technology was 0.43 s, the tracking refresh time was 0.47, and the total refresh time was 0.9 s. At this time, the model refreshes the image without delay. In mode 4, the test scenario is multitasking and high load. At this time, the detection refresh time was 0.51 s, and the tracking refresh time was 0.62 s. In Figure 5(b), the detection refresh time of mode 1 was 0.46 s, and the tracking refresh time was 0.51 s. In mode 4, the detection refresh time was 0.73 s and the tracking refresh time was 0.71 s. It can be seen that it has the long time and high latency compared to the traditional variational model. The image processing variational model based on the network control robot image transmission and processing system has a short refresh time in the multimedia enhancement technology and basically has no delay, which can meet the practical application.

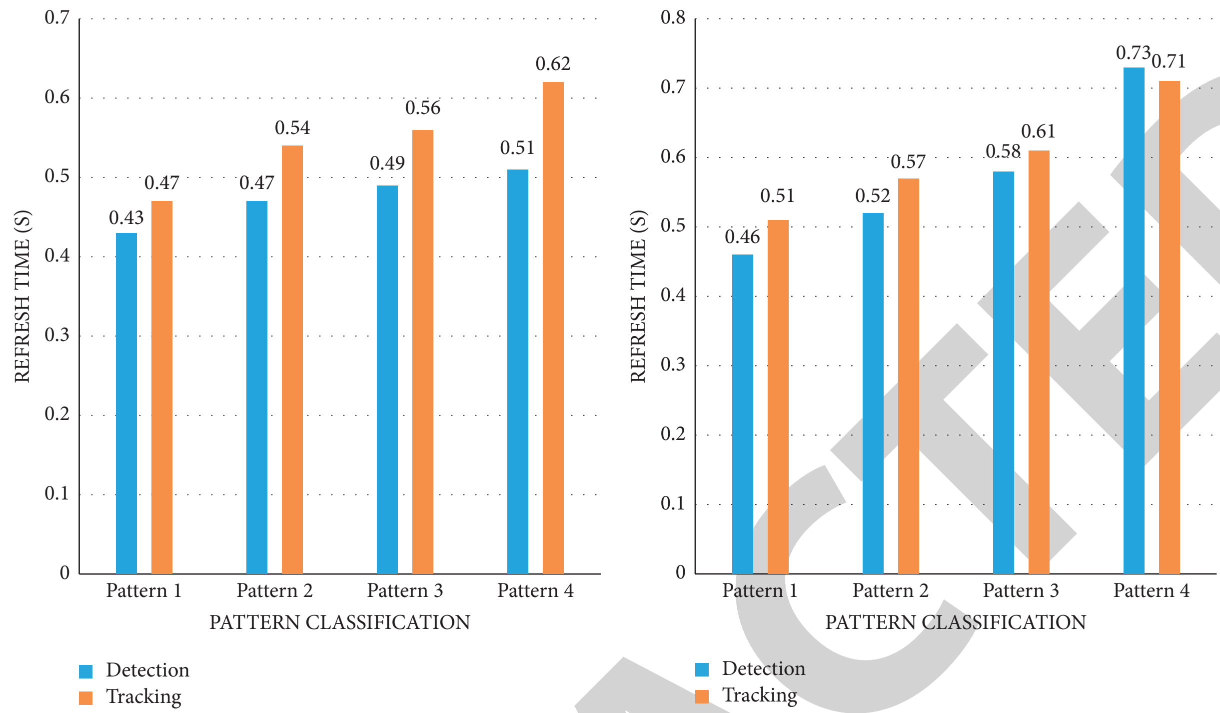
3.2. Performance Test. Performance testing is an important part of application testing. Under different sampling frequencies, the stability of multimedia enhancement technology is greatly challenged. At different frequencies, the test is carried out by observing the occupancy rate and usage rate of different image processing variational models in the application of multimedia enhancement technology to hardware devices. The results are shown in Figure 6.

In Figure 6, different sampling frequencies are set in this paper, but they are all within the range of normal working conditions. It can be seen from Figure 6(a) that under different sampling frequencies, the memory usage of the model in this paper in the application of multimedia enhancement technology had been in a stable range of 38.4%. The CPU occupancy rate fluctuated with the change of sampling frequency. As the sampling frequency increased, the occupancy rate also increased, from 47.2% to 54.1%, an increase of 6.9%. In Figure 6(b), both the memory usage and CPU usage of the traditional model had changed. Memory usage increased from 39.1% to 42.7%, and CPU usage increased from 47.5% to 56.2%, a change of 8.7%.

On the whole, the stability of the traditional image processing variational model in the application of multimedia enhancement technology is not ideal, and it fluctuates greatly with the change of sampling frequency. In this context, the normal function of the multimedia enhancement technology is very likely to be abnormal, which causes it to be in a state of failure. The variational model in this paper has better spatial adaptability, which can completely retain image information under the condition of increasing occupancy and usage.

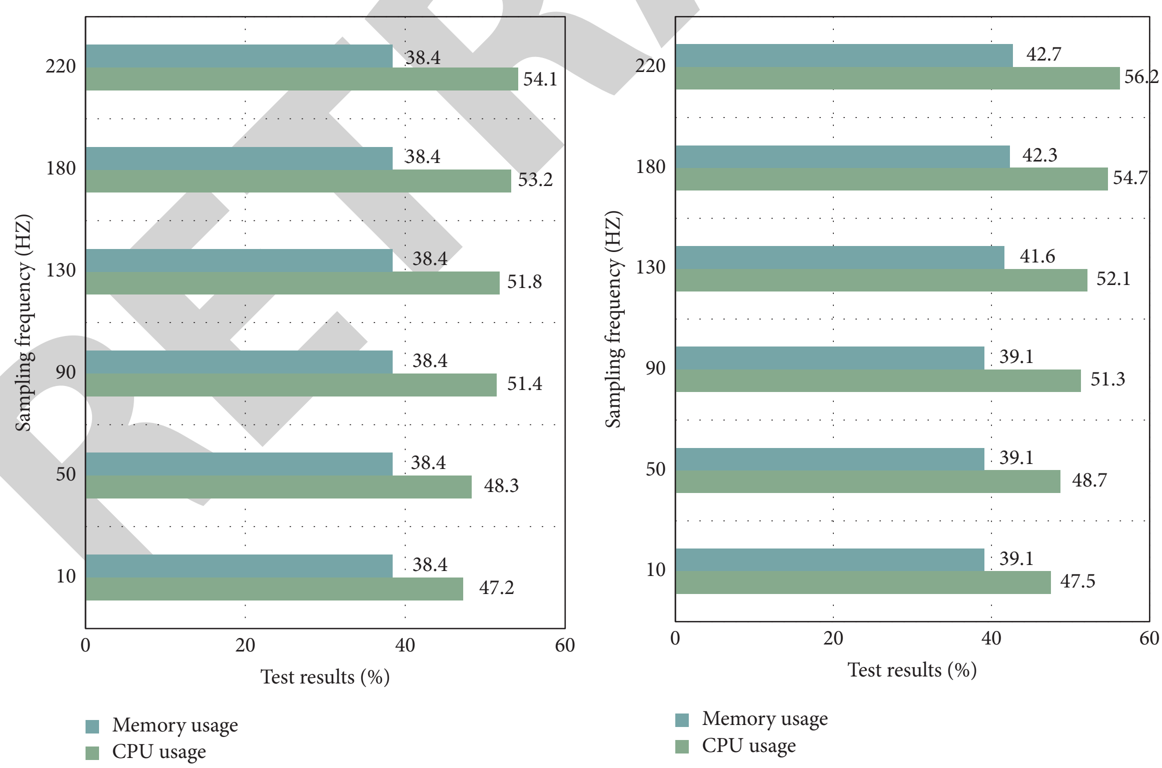
Under different working modes, the performance of the model is quite different. Therefore, under the same working mode, this paper observes the load capacity generated by full-function operation and partial-function operation under different pressures, as shown in Figure 7.

The load capacity test under different stress conditions in Figure 7 only compares the normal stable condition, which does not consider the failure condition. It is not difficult to see that there is a big difference between the performance of full-function operation and partial-function operation. The main reason is that the multimedia enhancement technology adopts multithreaded processing under full-featured operation, and the load is also high. While some functions are running, most of the technology modules are in an idle state. As can be seen from Figure 7(a), the image processing variational model in this paper had a better load capacity in the multimedia enhancement technology, and the test comprehensive value under full-function operation was 42.04%. Also, the test comprehensive value under partial-function operation was 20.92%. In Figure 7(b), the test comprehensive value of the traditional image processing variational model under full-function operation reached 53.94%, and the test comprehensive value under partial-function operation reached 26.72%. This may be related to the inability of variational models to compress image information efficiently. If the compression is not performed correctly, not only the key information cannot be completely output but also the technical load pressure is too large, which affects the follow-up work. The image processing variational model based on the network-controlled robot image transmission and processing system can better preserve the discontinuous information of the image in the multimedia enhancement technology. Also, it is effectively compressed to maintain a relatively ideal load effect.



(a) (b)

FIGURE 5: Task refresh time test results. (a) The refresh time of the model in this paper. (b) The refresh time of the conventional model.



(a) (b)

FIGURE 6: Occupancy and usage test results. (a) The occupancy rate and usage rate under this model. (b) The occupancy rate and usage rate under the traditional model.

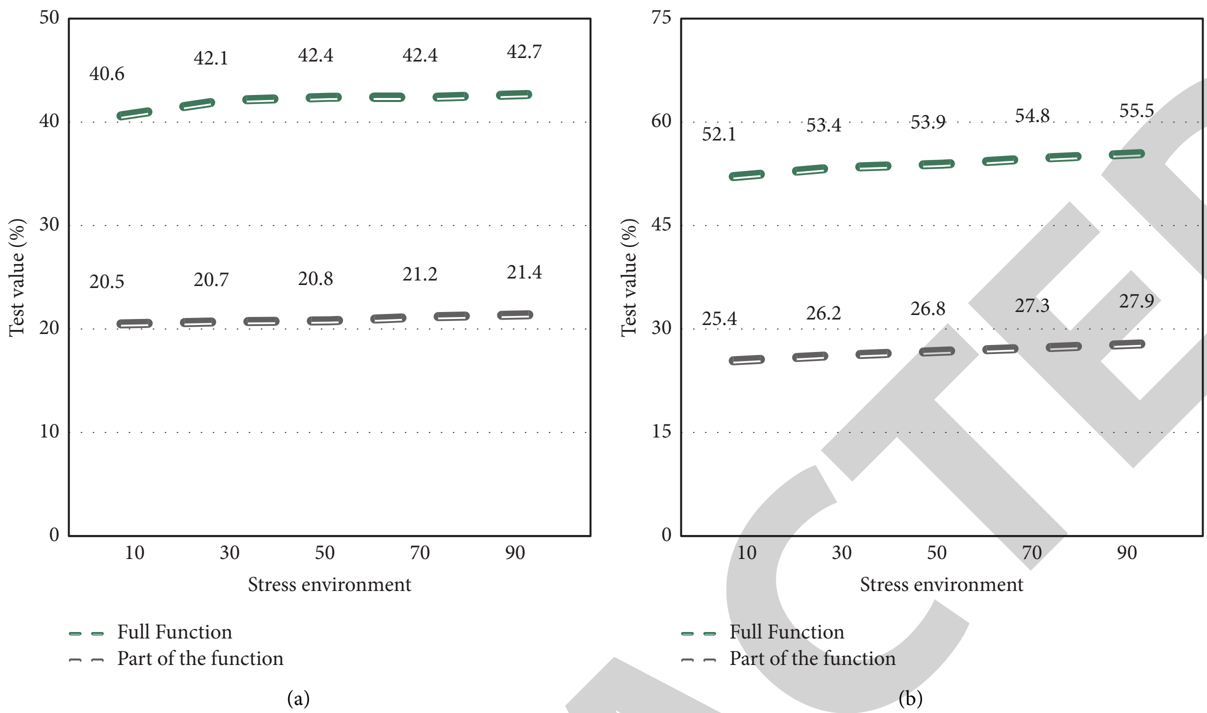


Figure 7: Load capacity test results. (a) The load capacity of this model. (b) The conventional model load capacity.

4. Conclusion

As a comprehensive form of multimedia information processing, multimedia enhancement technology is the product of the combination of communication technology and continuous development of multimedia technology. It is of great practical significance to improve its application value for improving the complex information environment of multimedia. In this paper, a new image processing variational model was proposed on the basis of the image transmission and processing system of the network-controlled robot. Also, it was applied in multimedia enhancement technology, which effectively improved the quality and effect of information transmission. In addition, under the condition of ensuring that the information resources were fully reserved, the consumption has been reduced, and the technical performance and practical effect have been improved. However, in the testing process, it is found that the research in this paper still needs continuous improvement in practical application. Under different sampling frequencies, the occupancy performance of the model in this paper in technical applications has improved, but there are still certain fluctuations. Also, this paper did not consider the application performance in different information environments. These two points still need to be continuously improved. In the future research work, it is necessary to continue to study the shortcomings of the image processing model and continuously improve its practical value in multimedia enhancement technology. It also makes full use of existing technology to improve research conditions and quality.

Data Availability

The data used to support the findings of this study are available from the corresponding author upon request.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

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