

## Research Article

# Feature Extraction of Color Symbol Elements in Interior Design Based on Extension Data Mining

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In order to improve the indoor color symbol elements in the design of visual communication ability, the interior design color symbol element feature extraction process is needed. We need to put forward a kind of extension data mining based on the interior design color symbol element feature extraction methods, build the visualization visual expression and big data characteristics of the distribution of the interior design of texture color symbol elements in intelligent information collection model, indoor color symbol elements in the design of the texture image and character segmentation, and extraction of texture and color symbol element in interior design edge feature point, based on the texture and edge profile characteristics of the distribution in the design of indoor color symbol elements of texture segmentation and matching, and extract the edge of the color symbol elements in interior design outline feature points. The extracted edge contour feature points of color image in interior design are used as the extended data feature components for texture matching, and the color symbol element feature extraction is realized according to the prior data distribution and extension data mining results. Simulation results show that this method has good adaptive performance in texture matching and feature extraction of color symbol elements in interior design and has a strong texture discrimination ability, which improves the visual communication ability of color symbol elements in interior design.

## 1. Introduction

With the development of modern interior decoration design technology, the color symbol element design in interior design is carried out under the computer vision environment [1, 2], and the creative idea of color symbol element design in modern interior design is adopted to design the composition and color of interior decoration design, so as to improve the color expression ability of interior decoration design and promote the balance and harmony of interior decoration design [3]. Through visual communication, interior decoration design can be more in line with human visual experience and improve the aesthetic value of interior decoration design. Research on visual communication optimization design technology of interior decoration design is based on the texture intelligent matching of color symbol elements in interior design, which adopts visual communication design method to optimize interior decoration design and pattern texture intelligent matching to achieve

the perfect combination of pattern texture and interior decoration design [4]. Research on feature extraction method of color symbol elements in interior design is of great significance in optimizing color image design in interior design. As a new concept of space design, humanized design generally follows the following main basic principles: First, adhere to the concept of environmental protection and prevention. In interior design, harmony with the natural environment is the main body of today's social development. Protecting the environment and avoiding waste of resources has become an important task of the society, and interior design must also abide by it. Second, take into account the principle of comfort. The most basic goal of interior design is to meet the needs of people's lives, maintain the comfort of the environment, and create a satisfactory living environment, which is also the basic principle of humanized space design. Third, ensure safety. As a place where people live in daily life, the safety demand should not be underestimated, which is also the foundation of space design. Without safety,

the design products cannot meet the requirements of humanized design [5, 6]. The safety here not only includes the safety of raw materials and products used in the design but also covers the safety of the living environment itself. Both of them are very important and play a complementary role.

In the study of interior design, it is necessary to adopt an optimized color symbol element feature extraction algorithm according to the feature distribution of color symbol elements in interior design to improve the expression ability of color symbols in interior design. Zhang and He [7] proposed a feature extraction method of color symbol elements in interior design based on block region contour detection, established a mesoscale spatial information clustering model of color symbol elements in interior design, and, combined with the spatial information fusion method, realized the feature extraction and recognition of color symbol elements in interior design. However, the time cost of color symbol element feature extraction in interior design is high, and the quality of feature extraction is not good. Reference [8] is proposed based on multiscale color symbol elements in interior design features of information fusion feature extraction methods, combined with the feature of multidimensional sampling method, in the design of indoor color symbol element feature extraction model design, combined with the feature of multidimensional registration method, and in the design of indoor color symbol element feature extraction and feature extraction. The feature extraction and recognition of color symbol elements in interior design is realized, but the process complexity of color symbol element feature extraction in interior design is large, and the intelligence of image feature extraction is not good. Reference [9] is proposed based on subspace division of color in interior design symbol element feature extraction method, and fuzzy information fusion method was adopted to realize the scale of the interior design color symbol elements in spatial information fusion and feature extraction and improve the adaptability of image feature extraction, but the method that is a 3D image feature extraction output of the fuzzy degree is bigger.

Aiming at the disadvantages of traditional methods, this paper proposes a color symbol element feature extraction method in interior design based on extension data mining, constructs an intelligent information collection model of color symbol element texture in interior design under visual expression and big data expansion feature distribution, adopts extension data mining and multidistribution information fusion method to enhance and optimize the detection of color symbol element texture information in interior design, extracts the edge contour feature points of color symbol elements in interior design, and realizes the adaptive matching of color symbol element texture in interior design. Finally, the simulation experiment is analyzed, and the validity conclusion is obtained.

## 2. Image Acquisition and Preprocessing of Color Symbol Elements in Interior Design

*2.1. Image Acquisition of Color Symbol Elements in Interior Design.* In order to realize the feature extraction of color symbol elements in interior design based on extension data

mining, firstly, a three-dimensional image reconstruction method is used to collect the visual information of color symbol elements in interior design, multimedia digital information reconstruction method is used to extract and sample the features of color symbol elements in interior design [10], image texture distribution area is used to extract the features of color symbol elements in interior design, and image feature reconstruction space technology is adopted. It is used to read three-dimensional data feature quantity of color symbol element texture in interior design to form raw file of color symbol element texture in interior design, establish PBO (OpenGL pixel cache object) of color symbol element texture in interior design according to spatial feature sampling technology, store the image in device memory, and read texture information of color symbol element in interior design; according to that data information of color symbol elements in interior design in device memory, the texture match of color symbol elements in interior design is carried out. The specific operation process is shown in Figure 1.

According to the above design idea, assume that the pixel set distribution of color symbol elements in interior design is  $n$ , and the output label category information feature quantity of color symbol elements in interior design is  $P(1) = [1 - L^{-1}]^{m-1}$ . According to the size and texture complexity of color symbol elements in interior design, the texture point pairs of interior decoration design are matched to obtain the texture distribution of color symbol elements in interior design:

$$E_m^{ij} = \sum_{k=0}^{255} e_{mk}^{ij}. \quad (1)$$

In formula (1),  $E_m^{ij}$  represents the color information of the  $i$ th row and the  $j$ -column in the data sampling sequence of color symbol elements in three-dimensional interior design,  $e_{mk}^{ij} = \begin{cases} -p_k \log(p_k) & p_k \neq 0 \\ 0 & p_k = 0 \end{cases}$  represents the edge information of color symbol elements in  $2 \times 2$  interior design, and texture registration is carried out in combination with pixel frame distribution. For pixels on each scale  $\sigma_l^{(n)}$  ( $1, 2, \dots, n$ ),  $K$ -order moment feature statistics are adopted to fuse the color symbol elements in interior design, and one sampling point is taken in each subinterval. The gray histogram of color symbol elements in interior design is obtained. For  $N$  color symbol element labels in interior design, the information fusion expression of color, texture, shape, and other characteristics of color symbol elements in interior design is as follows:

$$c(x, y) = [\Delta x \ \Delta y] \left[ \sum_w I_x^2 \sum_w I_x I_y \sum_w I_x I_y \sum_w I_y^2 \right] \begin{bmatrix} \Delta x \\ \Delta y \end{bmatrix}. \quad (2)$$

In formula (2),  $\Delta x$  and  $\Delta y$  are gradient features of color symbol elements in interior design, and  $I_x$  and  $I_y$  are edge pixel values of color symbol elements in interior design. An intelligent information collection model of color symbol elements in interior design based on visual expression and big data expansion feature distribution is constructed. The

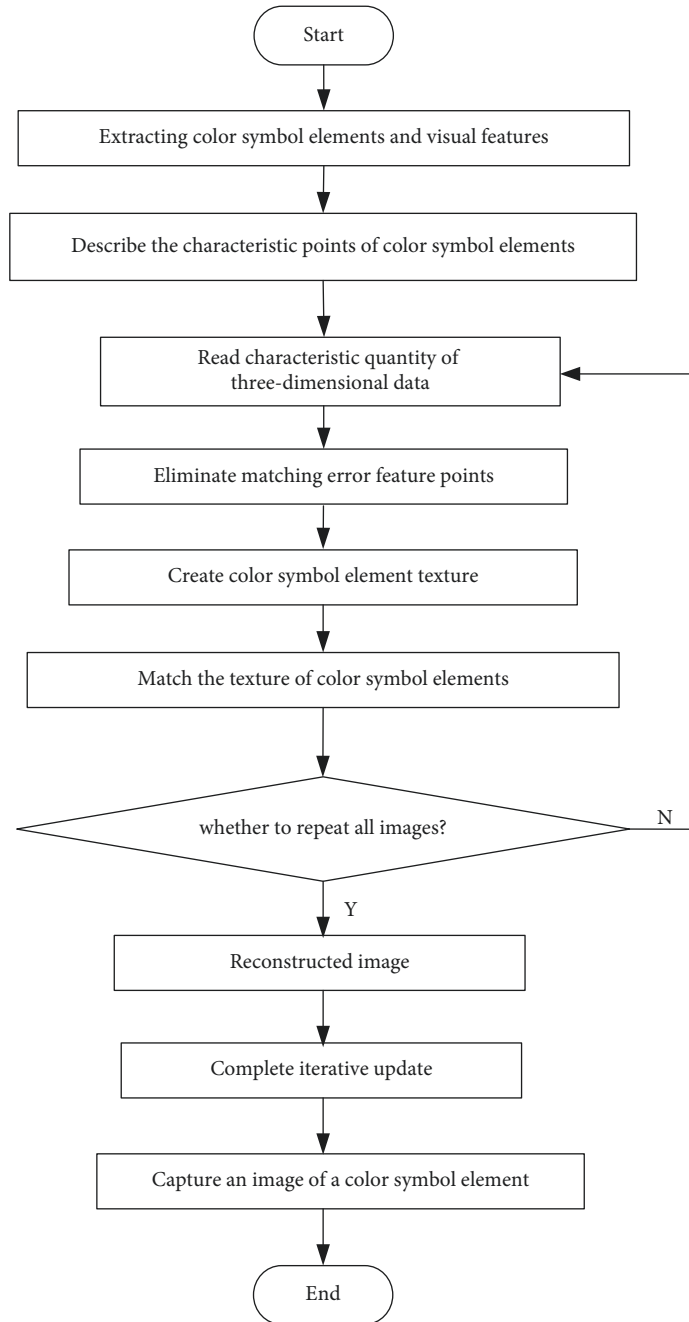


FIGURE 1: Color symbol element texture matching process.

extension data mining and color symbol enhancement technology are used to image and segment the color symbol elements in interior design, and the average energy of the window is investigated. In interior design, the texture space scale of color symbol elements is  $(x, y, \sigma)$ :

$$H = \begin{bmatrix} L_{xx}(x, \sigma) & L_{xy}(x, \sigma) \\ L_{xy}(x, \sigma) & L_{yy}(x, \sigma) \end{bmatrix}. \quad (3)$$

In formula (3),  $L_{xx}(x, \sigma)$  is the texture convolution of color symbol elements in interior design, and  $L_{xy}$  and  $L_{yy}$  have similar meanings. According to the fusion results of edge pixel sets of color symbol elements in interior design,

the multidimensional feature space reconstruction method is realized. The information of color symbol elements in interior design is collected, and the edge energy value of regional distribution pixels  $P(i, j)$  of color symbol elements in interior design is obtained. Based on this data input, the feature extraction and feature extraction of color symbol elements in interior design are carried out.

*2.2. Feature Segmentation of Color Symbol Elements in Interior Design.* The collection model of color symbol elements in interior design is established. The collected color symbol elements in interior design are processed by feature extraction

and information fusion. The artificial intelligence feature extraction of three-dimensional images is combined with multidimensional segmentation and gray histogram reconstruction. Image enhancement, as a basic image processing technology, aims to make the image more suitable for specific applications than the original image by processing it; that is, image gray enhancement is purposefully carried out according to specific needs [11]. Through image enhancement, the visual quality of the image is improved so that the observer can see more direct, clear, and suitable information for analysis. Traditional image gray enhancement methods can be divided into two categories: spatial domain method and frequency domain method [12–14]. The spatial domain image gray enhancement method directly processes the gray values of pixels in the image, such as linear gray transformation, nonlinear gray transformation, and histogram equalization. The frequency domain image gray enhancement method firstly transforms the image in the frequency domain, then performs corresponding operations on each spectrum component, and finally obtains the required results through inverse frequency domain transformation. Any image grayscale enhancement algorithm can achieve a satisfactory enhancement effect only in specific situations. In image processing, one of the simplest and most practical tools is the gray histogram of the image. The quality of an image can be roughly judged by the distribution of its gray histogram. If the gray histogram of an image is squeezed in a small gray range, the dynamic range of the grayscale of the image will be small, the contrast of the image will be poor, and the quality of the image will be poor [15]. On the contrary, if the dynamic range of the grayscale of the image is large, the contrast of the image will be good. To improve the small dynamic range of grayscale of images, an intuitive idea is to modify the histogram of images. The commonly used methods to modify the histogram are grayscale transformation and histogram enhancement. Grayscale transformation, also known as contrast expansion and adjustment, is an enhancement method that transforms an image pixel by pixel. Generally, the grayscale of an image is modified point by point by linear or nonlinear functions to achieve image enhancement. Histogram enhancement technology is a technology of image enhancement by changing all or part of image contrast, and one of its typical processing methods is histogram equalization. The idea of histogram equalization is to make some mapping transformation of the pixel grayscale in the original image so that the probability density of the transformed image grayscale is uniformly distributed; that is, the transformed image grayscale is uniform, which means that the dynamic range of the image grayscale is increased and the contrast of the image is improved. The texture imaging and feature segmentation of color symbol elements in interior design are carried out by extension data mining and color symbol enhancement technology, and the texture and edge feature points of color symbol elements in interior design are extracted [16]. According to the known pixel points of color symbol elements in interior design, the maximum intensity of texture distribution of color symbol elements in interior design is obtained, and the matching value of the regional template of interior decoration design image is determined as follows:

$$J^{\text{dark}}(x) = \min_{c \in \{r, g, b\}} \left( \min_{y \in \Omega(x)} (J^c(y)) \right). \quad (4)$$

In formula (4),  $J^c$  is the similarity characteristic quantity of color symbol elements in interior design,  $J^c(y)$  is the similarity characteristic component of characteristic component  $Y$ , and  $\Omega(x)$  is the neighborhood size. The self-adaptive block feature matching method is adopted to determine the priority coefficient of color symbol elements output in interior design, and the relationship of color symbol elements output to epipolar geometry in interior design is described as follows:

$$P = \sum_{i=1}^M \left( \lambda_i \cdot \frac{\sum_{m=1}^{|\text{SR}|} p_{im} T_{\text{SR}m}}{\sum_{m=1}^{|\text{SR}|} \lambda_{\text{SR}m}} \right). \quad (5)$$

In formula (5),  $p_{im}$  is the gray information of color symbol elements in interior design,  $T_{\text{SR}m}$  is the nearest neighbor sampling feature of color symbol elements in interior design,  $\lambda_{\text{SR}m}$  is the nearest neighbor sampling width, and  $\lambda_i$  is the multiscale feature component of color symbol elements. The template registration of color symbol elements in interior design is carried out by the texture intelligent matching method, and the template registration function is constructed as follows:

$$\text{STFT}(t, f) = \int_{-\infty}^{\infty} x(\tau) h^*(\tau - t) e^{-j2\pi f\tau} d\tau. \quad (6)$$

In formula (6),  $x(\tau)$  is the dynamic component of color symbols in interior design,  $h^*(\tau - t)$  is the color distribution delay,  $f$  is the frequency domain component of pixel distribution, and  $t$  is the edge of the maximum gray value of the image. Using the pixel difference and spatial distribution pixel level of color symbol elements in two interior designs, the texture matching window of interior decoration design is

$$\text{SPEC}(t, f) = |\text{STFT}(t, f)|^2. \quad (7)$$

In formula (7),  $|\text{STFT}(t, f)|$  represents the absolute average value of  $\text{STFT}(t, f)$ , which represents the associated characteristic components of color symbol elements in interior design. By adopting the adaptive block technology, a matching window of color symbol elements texture template in interior design is established, and the texture distribution function of color symbol elements in interior design is described as

$$U(x) = 1 - \bar{t}'(x) = \omega \tilde{U}(x) = \omega \min_{c \in \{r, g, b\}} \left( \min_{y \in \Omega(x)} \left( \frac{I^c(y)}{A} \right) \right). \quad (8)$$

In formula (8),  $\bar{t}'(x)$  is the difference feature,  $\omega$  is the adaptive distribution weight,  $\tilde{U}(x)$  is the dynamic component of color symbol element texture in interior design,  $I^c(y)$  is the spatial distribution intensity of Lab, and  $A$  is the sampling amplitude of texture color. Through two-dimensional function expression, color symbol element texture

segmentation in interior design is carried out. The schematic diagram of the implementation process is shown in Figure 2.

### 3. Optimization of Feature Extraction of Color Symbol Elements in Interior Design

3.1. *Extraction of Texture and Edge Feature Points of Color Symbol Elements in Interior Design.* On the basis of constructing the intelligent information collection model of color symbol element texture in interior design based on visual expression and big data extended feature distribution, the feature extraction of color symbol element in interior design is carried out, and a feature extraction method of color symbol element in interior design based on extension data mining is proposed. The edge of an image is an important feature of an image [17]. It is a collection of pixels whose distribution of grayscale and texture is discontinuous and whose surrounding characteristics have a step change or a roof-like change. The edge part of an image concentrates most of the information of the image, and the edge structure and characteristics of an image are often an important part to determine the characteristics of the image [18, 19]. Another definition of the edge of an image refers to the set of pixels whose surrounding pixels have discontinuous gray changes. Edge exists widely between objects and background and between objects, so it is an important feature of image

segmentation, image understanding, and image recognition. Image edge detection is mainly used to enhance the contour edge, details, and gray jump in the image and form a complete object boundary so as to separate the object from the image or detect the area representing the same object surface. So far, the most common method is to detect the discontinuity of brightness value, which is detected by the first derivative and the second derivative [20]. Taking the characteristic points of edge texture distribution as the center, the fuzzy characteristic distribution function  $W_{mE}^{ij}$  of color symbol elements in interior design is calculated in the triangle area of irregular texture distribution. The initial pixel set of color symbol elements in interior design is described by  $L(a, b_m) = \sum_{V_m} \in P^{res} \sum_{V_n \in P^{true}} |V_m \cap V_n| / |V| \log(|V| |V_m \cap V_n| / |V_m| |V_n|)$ , and the distribution scale function of characteristic points of color symbol elements in interior design is expressed as follows:

$$W_{mE}^{ij} = \frac{E_m^{ij}}{\sum_{m=1}^N E_m^{ij}} \quad (9)$$

In formula (9),  $E_m^{ij}$  is the statistical characteristic quantity of color symbol element significance detection, and  $N$  is the element point dimension. In the gray neighborhood of color symbol element in interior design, the length of spatial distribution cluster center of texture matching is as follows:

$$d_{mn}^{ij}(x, y) = \begin{cases} \frac{\sum_{k=-s}^{+s} |\theta_m^{ij}(x+k, y+k) - \theta_n^{ij}(x+k, y+k)|}{(2s+1)^2}, & m \neq n, \\ 0, & m = n. \end{cases} \quad (10)$$

In formula (10),  $m$  and  $n$  are three-dimensional image projection numbers of color symbol elements in interior design,  $i$  and  $j$  are feature matching points of color symbol elements in interior design, and  $\theta$  is the regional rotation angle of color symbol elements in interior design. Taubin smoothing operator is used for three-dimensional reconstruction of color symbol elements in interior design [21], and the main direction feature components of edge contour of color symbol elements in interior design are recorded as follows:

$$D_{mn}^{ij}(x, y) = \begin{cases} 1, & d_{mn}^{ij}(x, y) \geq \text{median}(d_{mn}^{ij}(x, y)), \\ 0, & \text{else.} \end{cases} \quad (11)$$

In formula (11),  $\text{median}(\cdot)$  is the expression of median operation, and  $d_{mn}^{ij}(x, y)$  is the distribution distance of boundary points of medium color symbol elements. According to the sparsity of boundary pixels of color symbol elements in interior design, the texture matching value  $W_{mD}^{ij}$  is as follows:

$$W_{mD}^{ij} = \begin{cases} 1, & n_{md}^{ij} < \alpha, \\ 0, & \text{else.} \end{cases} \quad (12)$$

In formula (12),  $n_{md}^{ij}$  represents the edge pixel set of color symbol elements in interior design, and  $\alpha$  is the ratio of the number of all pixels, which is set to 5%. The extension data mining and color symbol enhancement technology are used to image and segment the color symbol elements in interior design, and the texture and edge feature points of color symbol elements in interior design are extracted [22]. According to the texture distribution and edge contour feature distribution, texture segmentation and automatic matching are carried out under visual expression and big data expansion feature distribution.

3.2. *Visual Communication of Color Symbol Elements in Interior Design.* Extract texture and edge feature points of color symbol elements in interior design, perform texture segmentation and automatic matching of color symbol elements in interior design under visual expression and big data expansion

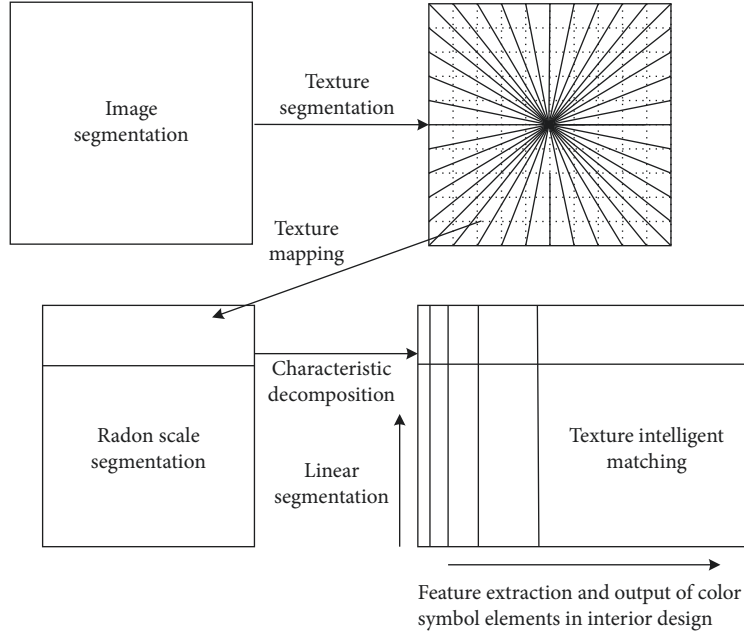


FIGURE 2: Schematic diagram of the realization process of color symbol element texture segmentation in interior design.

feature distribution according to texture distribution and edge contour feature distribution, construct texture active contour components of color symbol elements in interior design in a  $4 \times 4$  subgrid area, and set SF as edge pixel set of color symbol elements in interior design. The adaptive block feature matching method is used to match the window template. Shape is a kind of existence or expression of things or substances, such as rectangle and square. In an image, a shape is a way to describe an edge or an area [23]. HALCON shape-based matching is a pattern recognition algorithm that identifies and locates the measured object through the edge of the image. This algorithm has good robustness to the change of illumination and fast processing speed, so it is a common positioning method in industrial vision solutions [24]. HALCON uses a hysteresis threshold algorithm to extract edges and adjusts the integrity of edges by modifying “contrast (low)” and “contrast (high).” In the process of edge extraction, pixels whose contrast exceeds “contrast (high)” will be selected as edge points by the algorithm, pixels whose contrast is lower than “contrast (low)” will be regarded as background by the algorithm, and the points between them will be selected as candidate points. If these points are connected with the selected edge points, they will also be selected. Adjust “contrast (high)” to make most edges visible, then adjust “contrast (low)” to remove noise with low contrast, and finally adjust “minimum component size” to remove smaller noise edges [25]. In  $N \times N$  window,  $w_i$  is used as the weighting vector, and the center pixel set and edge pixel set of color symbol elements in interior design are, respectively, expressed as follows:

$$I_{if}(x, y) = I * G(x, y, \sigma_i), \quad (13)$$

$$I_{iv}(x, y) = I * \text{stdfilt}(x, y, w_i), \quad (14)$$

$$S_{gif}(x, y) = -\log(P_{if}(x, y)). \quad (15)$$

In formula (13) to (15),  $G(x, y, \sigma_i)$  represents the multicolor set of color symbol elements in interior design,  $I$  is the segmented texture of color symbol elements,  $\text{stdfilt}(x, y, w_i)$  is the standard color component, and  $P_{if}(x, y)$  is the reconstructed spatial distribution domain of images. On each scale  $\sigma_I^{(m)}$  ( $1, 2, \dots, n$ ) of color symbol elements in interior design, the texture matching hierarchical function of color symbol elements in interior design is calculated, and the feature distribution of color images in interior design is obtained by feature segmentation according to the edge contour feature points of images:

$$\begin{aligned} f_R(z) &= \begin{pmatrix} f_x(z) \\ f_y(z) \end{pmatrix} \\ &= \begin{pmatrix} h_x * f(z) \\ h_y * f(z) \end{pmatrix}. \end{aligned} \quad (16)$$

In formula (16),  $f(z)$  is the texture feature component of color symbol elements in interior design,  $*$  is convolution operation,  $f_x(z)$  is the significant graph of color symbol elements in interior design, and  $f_y(z)$  is the significant  $Y$  component of color symbol elements in interior design. Calculate the edge information feature quantity of color symbol elements in interior design, and let  $I_x$  be the block feature matching set of color symbol elements in interior design, where  $x = P, N$ , and the active contour of color symbol elements in interior design is as follows:

$$S_c = [S_0, \dots, S_{Q-1}]_{\text{binary}} = \left[ \sum_i^{Q-1} S_i \times 2^i \right]_{\text{Dec}}, \quad (17)$$

$$S_i = \sum_j^{W \times W} I_x^j. \quad (18)$$

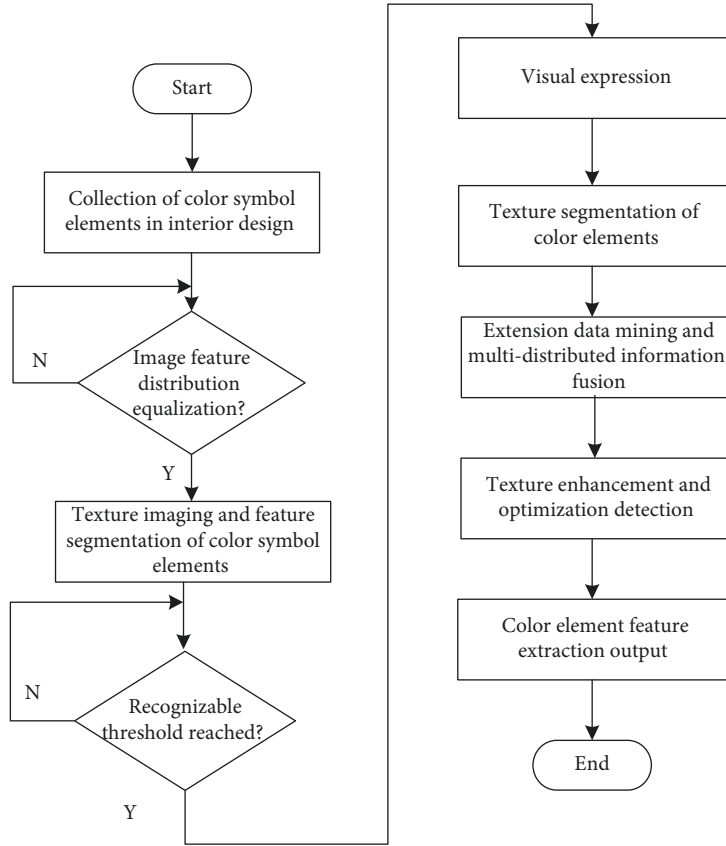


FIGURE 3: Algorithm optimization implementation process.

In formulas (17) and (18),  $Q$  is the edge scale of color symbol elements in interior design,  $W$  is the weak edge feature quantity, and  $I_x^j$  is the texture detection component of color symbol elements. The extension data mining and multidistribution information fusion method are used to enhance and optimize the texture information detection of color symbol elements in interior design [26], and the output texture intelligent matching map is as follows:

$$w(i, j) = \frac{1}{Z(i)} \exp\left(-\frac{d(i, j)}{h^2}\right). \quad (19)$$

In formula (19),  $Z(i) = \sum_{j \in \Omega} \exp(-d(i, j)/h^2)$  represents the symbol distance function of color symbol element feature extraction in interior design,  $h$  is the displacement characteristic of color symbol element, and  $d(i, j)$  is the fusion characteristic value of edge pixels, so that  $H_x, H_y$  are the wavelet characteristic solution of color symbol element in multiresolution interior design. To sum up, the edge contour characteristic points of color symbol element in interior design are extracted, and the extracted edge contour characteristic points of color image in interior design are used as extended data feature components for texture matching. According to prior data distribution and extension data mining results, color symbol element feature extraction is realized. The implementation flow is shown in Figure 3.

**3.3. Simulation and Result Analysis.** In order to test the application performance of the improved method in color symbol element feature extraction and feature extraction in interior design, a simulation experiment was carried out in Matlab. The frame scanning frequency of color symbol element collection in interior design was 3400 kHz, the pixel error range of texture feature distribution was 0.35~0.85, the feature block scale of color symbol element in interior design was  $a = 0.43$ , the iteration step of texture matching was 12, and the simulation times were 2000. See Table 1 for other parameter settings.

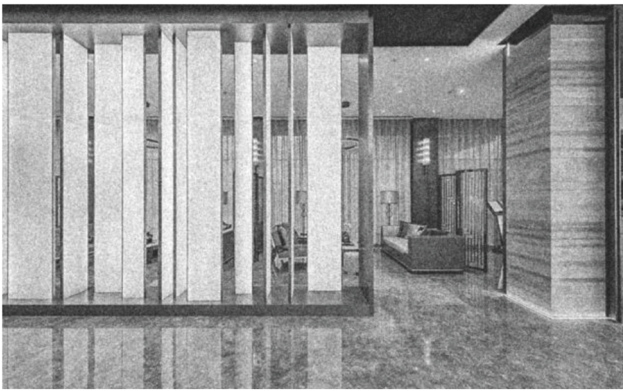
According to the above simulation environment and parameter settings, the color symbol elements in interior design are extracted and simulated, and the color symbol elements in interior design are obtained as shown in Figure 4.

Taking the color symbol element image in the interior design of Figure 3 as the research object, the feature extraction of color symbol elements in interior design is carried out. The visual feature detection results are shown in Figure 5, and the output of the original feature extraction results of color symbols is shown in Figure 6.

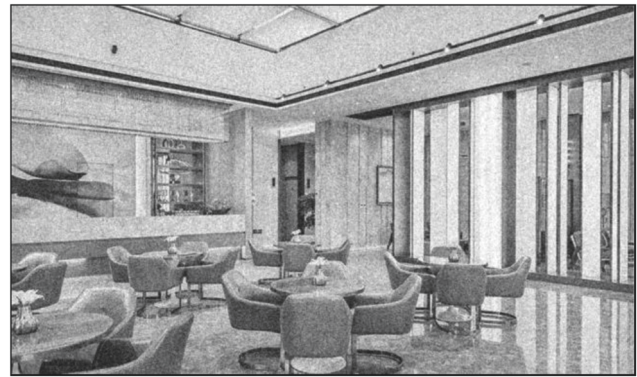
According to the analysis of Figures 5 and 6, this method can effectively realize the feature extraction of color symbol elements in interior design under visual expression and big data expansion feature distribution, and the effect of texture matching is good. The accuracy of color symbol element

TABLE 1: Parameter setting.

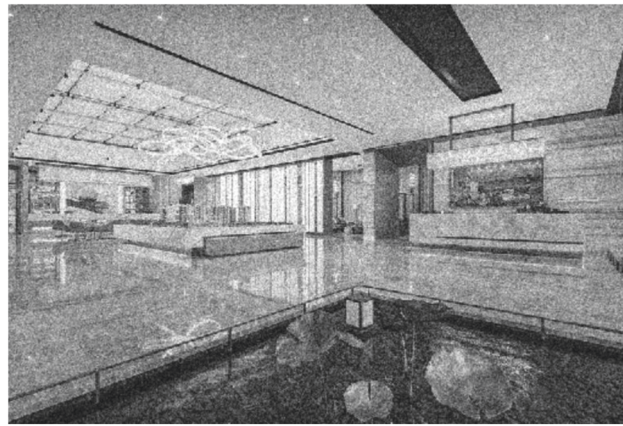
Sample	Pixel value	Texture segmentation threshold	Edge pixel fusion coefficient
1	0.931	1.375	0.899
2	0.391	4.846	0.876
3	1.144	1.247	0.833
4	0.382	5.796	0.893
5	1.998	1.628	0.834
6	0.469	2.311	0.888
7	1.243	4.819	0.848
8	1.736	5.583	0.895
9	1.988	6.010	0.862
10	2.777	1.785	0.858
11	0.772	6.818	0.850
12	1.400	3.039	0.825



(a)



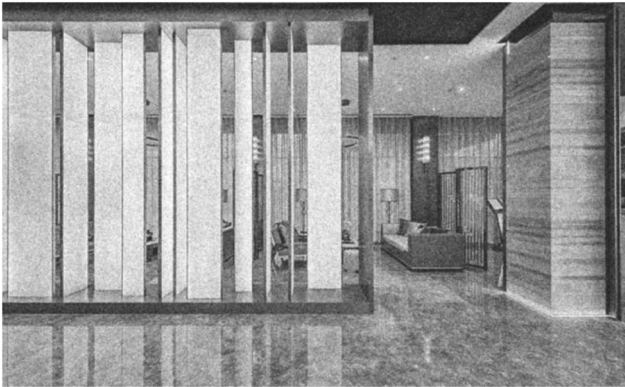
(b)



(c)

FIGURE 4: Color symbol elements in the original interior design. (a) Sample 1. (b) Sample 2. (c) Sample 3.

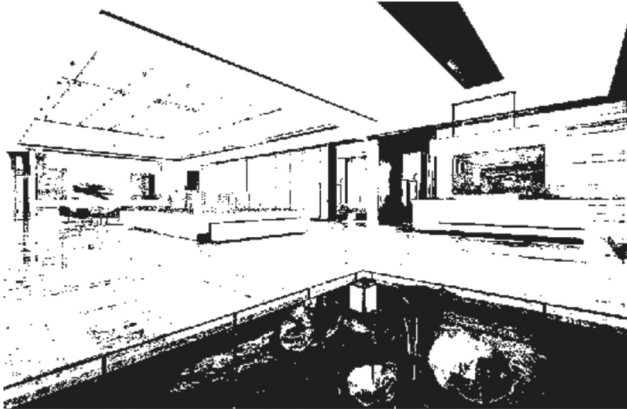




(a)



(b)



(c)

FIGURE 5: Results of feature extraction of color symbol elements in interior design. (a) Sample 1. (b) Sample 2. (c) Sample 3.



(a)



(b)

FIGURE 6: Continued.



(c)

FIGURE 6: Extraction results of original features of color symbols. (a) Sample 1. (b) Sample 2. (c) Sample 3.

TABLE 2: Comparison of matching accuracy.

Iterations	Improve one's method	PCA	PSO
100	0.945	0.846	0.814
200	0.959	0.861	0.844
300	0.977	0.916	0.917
400	0.996	0.926	0.925

feature extraction in interior design is tested, and the comparison results are shown in Table 2.

The analysis shows that the proposed method has higher accuracy in color symbol element feature extraction in interior design.

#### 4. Conclusions

Interior decoration design is carried out through visual communication so that the form of interior decoration design is more in line with human visual experience and the aesthetic value of interior decoration design is improved. A method of color symbol element feature extraction in interior design based on extension data mining is proposed. The research shows that this method can effectively realize the feature extraction of color symbol elements in interior design under visual expression and feature distribution of big data expansion, the texture matching effect is better, and the accuracy is higher.

Future research can increase the creativity of human beings reflected in the design of interior spaces and use this as a basis to produce a better living environment. Looking at the development situation at home and abroad, interior design reflects the most basic demands of human life. In the premise of a substantial increase in material life level, human requirements constantly improve, also produce a large number of excellent interior humanized space-related designs, and increase the color symbol in the interior design of visual communication ability research, and seepage affects the living environment of people's life, foreshadowing for the field application.

#### Data Availability

The raw data supporting the conclusions of this paper can be obtained from the author without undue reservation.

#### Conflicts of Interest

The author declares that there are no conflicts of interest regarding this work.

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