Research on Big Data Analysis Technology of Chinese Traditional Culture Yue embroidery Color Network

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Abstract: With the rapid development of big data technology, it is necessary to transform the color elements of Guangdong embroidery in Chinese traditional cultural phenomena into data resources that can be stored and analyzed for its sustainable development. It is the requirement of the times for the development of modern design field. Based on the big data technology, this paper extracts the traditional Chinese Guangdong embroidery color with Chinese national representative by K-Means clustering method, and puts forward a method to judge the saliency of the color characteristics of cultural phenomena, and studies the color characteristics of traditional Chinese cultural phenomena.

1. Introduction
As a discipline, color has been brought into systematic theory by artists and designers [1]. With the rapid development of modern design, the field of design attaches great importance to the study of color. In addition, with the rapid development of Internet, Internet of Things and cloud computing technology, data has become a new valuable and available resource, which provides a new development opportunity for modern art design. How to transform the traditional Chinese color culture of Yue embroidery into scientific data resources for research has become the requirement of the development of the times [2]. At the same time, big data technology has opened up a new and rigorous research way for the traditional color academic research in China, which will change the previous subjective perceptual research methods.

2. The color characteristics of Yue embroidery in Chinese traditional culture
Yue embroidery is the general name of Yue embroidery. It is called the four famous embroidery in China together with Su embroidery, Shu embroidery and Hunan embroidery [3]. Yue embroidery has a long history, and its composition is busy and lively. The needle method is simple, its embroidery thread is thicker, needle feet are different in length, and the needle lines overlap and slightly protrude. In the use of color, the color matching is rich and appropriate. According to different themes, the color matching is different. For example, the color of festive themes and flower themes is gorgeous and colorful. More use of bright colors with high purity and brightness, good use of contrast colors, make Yue embroidery look gorgeous and free from vulgarity. The colors of Yue embroidery often use a series of light and soft colors: earth color system, beige color, apricot color, etc. These colors can be seen in animals, plants, buildings, figures and other subjects.

3. Related technologies based on color features
With the rapid development of big data technology, the combination of protection and research of Chinese traditional culture with big data technology has become a major trend [4]. The application of big data technology provides beneficial technical support for the protection and inheritance of Chinese
traditional culture. Combining the research of Chinese traditional culture with big data technology and transforming traditional culture into digital form for research and preservation has become an inevitable trend of the development of the times. In addition, compared with other visual features, color features have less dependence on the size, direction and perspective of the image itself, so they have higher robustness. In the era of big data, color feature extraction technology has been widely studied and applied by experts and scholars. For example, using K-Means clustering color extraction method to study the color of Chinese traditional culture can achieve good results.

4. Research on color extraction features based on K-Means clustering

4.1 Color feature extraction technology

K-Means clustering color extraction methods mainly include single image color extraction method and multi-image color extraction method. Single image color extraction is to process all the pixels of an image into a data set in the color space. In the process of color extraction, three kinds of data need to be input: the path of image sample library to extract color, the number of color to extract and the number of color iterations to extract color. The algorithm calculates the distance between the color value of each pixel and the clustering centers, and classifies them into the categories represented by the nearest clustering centers. After all the pixels are classified, the average of all the pixels in each class is calculated as the new clustering center. When the algorithm is finished, the final clustering center value is output, that is, the color of the extracted single picture.

![Figure 1: Multi-graph color clustering process](image)

Multi-image color extraction is based on a large number of samples of a certain kind of image, and extracts representative color elements of the overall visual image of this kind of image [5]. The basic method of multi-image color extraction is to cluster the results of many single images for the second K-Means clustering to get the final color. The process of multi-graph color clustering is shown in Figure 1.

4.2 Online color clustering algorithm based on K-Means for multiple images

There are two key steps in the online color clustering algorithm for multi-images: first, the judgment of the clustering center to which the new image material extracts color; second, updating and modifying the clustering center to which the new image material belongs. The calculation flow of the online clustering algorithm is shown in Figure 2 below.
4.3 Extraction method of color feature of Yue embroidery

Select a large number of random unrelated pictures for standard deviation calculation, and then calculate the average value of standard deviation of the extracted color for irregular and non-characteristic pictures, as a judgment value of non-characteristic pictures. Then, the standard deviation of color extraction from traditional Chinese cultural phenomena is compared, and the final result shows the distinctive feature saliency in the form of more intuitive percentage data. Calculate the standard deviation between colors to see the dispersion of this color. The smaller the standard deviation, the smaller the dispersion of similar colors contained in extracted color and extracted color, the more obvious the characteristics of sample color. On the contrary, the larger the standard deviation, the less obvious the characteristics of sample color. The standard deviation formula is as follows.

$$\sigma = \sqrt{\frac{1}{N} \sum_{i=1}^{N} (X_i - \mu)^2}$$

$$\sigma$$ denotes standard deviation, $$\mu$$ is average, $$X_1, X_2, X_3, X_4... X_i$$ is the real number and $$N$$ is a real number. The calculated standard deviation is actually equivalent to the distance from the color value of a pixel to the extracted color (i.e. the clustering center).

4.4 Establishment and application of Yue embroidery color relation network

The so-called color relationship network, in fact, is to show the collocation relationship between various colors. Its purpose is to understand the color collocation relationship of the object of study, and to assist designers in their design work in a scientific and rigorous way. The color relationship network is divided into two steps: the main color selection and the auxiliary color selection. The line between the dots indicates that the two colors have co-existed. The distance between the diameter of the circle and the diameter of the circle represents the standard deviation of the extracted color, the larger the distance is, the larger the standard deviation, on the contrary, the smaller the distance, the smaller the standard deviation. By calculating the standard deviation of the extracted color, the color characteristics and the saliency of the color features of Yue embroidery were analyzed. By calculating
the standard deviation of the extracted color, the color characteristics and the saliency of the color characteristics of Yue embroidery are analyzed, and the color relation network map of Yue embroidery is drawn to study the color matching law of Yue embroidery. The calculation results of the color relation network map and standard deviation value of Yue embroidery are shown in Figure 3 below. It can be seen that the extraction color puri ty of Yue embroidery is high, and the overall color style is appropriate. The extraction results are consistent with the color characteristics of Yue embroidery literature.

![Figure 3. Yue embroidery color network](image)

5 Conclusions

With the rapid development of modern design, it is necessary to keep its own national personality and creativity. The study of Chinese traditional color culture of Yue embroidery has become a necessary requirement to seek its own national characteristics. Through the use of scientific and rigorous research methods, it will help to change the previous subjective perception research methods, will also help to promote the traditional Chinese color culture, enhance the artistic value of the current design, as well as the traditional Chinese culture of Yue embroidery color inheritance and promotion.

References

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