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Abstract: Pomegranate pattern is a traditional Chinese plant pattern, which has a beautiful meaning of more sons and more blessings. Pomegranate pattern began to be popular on a large scale in the Tang Dynasty. According to the combination law of pomegranate pattern in the Tang Dynasty, the pomegranate pattern in the new Tang Dynasty was reconstructed to enrich the language and cultural connotation of modern graphic design. Through the extraction and analysis of pomegranate patterns in Heijiacun cultural relics group and Dunhuang Mogao Grottoes, this paper obtains the modeling characteristics, composition rules and connotation of pomegranate patterns in the Tang Dynasty, summarizes the aesthetic characteristics of the multi-combination of pomegranate patterns in the Tang Dynasty, forms the combination method of pomegranate patterns in the new Tang Dynasty. On the basis of research and analysis, the pattern is extracted and vectorized by software, and the digital application mode of Tang pomegranate pattern is constructed. The free matching of pattern shape, composition rule and color is realized, and the new pomegranate pattern is generated. According to its connotation, it is applied to the design practice of indoor soft fabric art, which not only provides new ideas for indoor soft cloth art design, but also integrates Chinese traditional culture organically, so as to exude the charm of Chinese traditional culture.

Keywords: Tang pomegranate pattern, Composition law, Pattern extraction, Indoor fabric soft outfit.

1. Introduction

Soft cloth art is an indispensable part of interior decoration, interior decoration to add a sense of atmosphere, but also placed the user a better life expectations. The pomegranate pattern began to spread on a large scale in the Tang Dynasty, so the pomegranate pattern in this period also greatly affected the development of pomegranate pattern in later generations. By constructing the digital application mode of the pomegranate pattern in the Tang Dynasty, the new pomegranate pattern in line with modern aesthetics is reconstructed. According to its pattern implication, it is used in indoor soft decoration to explore universal methods for the application of pomegranate pattern in the Tang Dynasty. At the same time, it strengthens the application of traditional cultural elements in indoor soft decoration, inherits and carries forward traditional Chinese patterns.

2. Development of Soft Cloth

Soft Cloth Art Influenced by Economic Development, Times Change and Life Style Change. Because of the integration of Western culture and art, it has formed a diversified style, including Nordic style, pastoral style, Mediterranean style, European style, new Chinese style, etc. However, there are few artistic styles that take Chinese traditional patterns as the aesthetic subject. With the change of the times, the aesthetic style is also changing. The application of traditional culture should abandon the doctrine of taking, and should be applied by modern means on the basis of inheritance. Soft fabric art has become an important development direction of soft decoration design. In the design, the charm of Chinese traditional culture is displayed, so that users can perceive and inherit national culture in the process of use[1].

3. Overview of Pomegranate Patterns

The spread of pomegranate culture is an important part of ancient Silk Road culture[2]. From the unearthed artifacts, pomegranate patterns prevailed in the Tang Dynasty, the late development and application of pomegranate far-reaching impact[3]. Taking the single pomegranate pattern as the main body, it is combined with other patterns to form different auspicious patterns. For example, the pomegranate pattern and the grape pattern are combined to form a pattern, which has the meaning of many sons and many blessings. Tang Dynasty pomegranate patterns are divided into realistic pomegranate patterns, as shown in Figure 1; as well as the composite pomegranate, the composite pomegranate pattern is also the “sea pomegranate” pattern mentioned by later generations. As shown in Figure 2, the predecessor of the “sea pomegranate” pattern is Mani bead.

Figure 1: Realistic pomegranate pattern

Figure 2: Compound pomegranate pattern

After the Jin and Yuan Dynasties, its early religious significance gradually disappeared, and the decorative meaning was transformed into the common “rich and noble” and “many sons and many grandsons” in the folk auspicious patterns[4]. In the composite pomegranate patterns, it is divided into three categories: pomegranate-like pattern, peach-like pomegranate pattern and bottle-like pomegranate pattern. Among them, the pomegranate-like pattern is mostly
developed from the abstract honeysuckle leaf decoration combination pattern. In the early Tang Dynasty, composite pomegranate pattern was the mainstream. In the middle and late 8th century, realistic pomegranate pattern began to be popular[5]. This paper focuses on the extraction and induction of the aesthetic characteristics of the composite pomegranate patterns in the Early Tang Dynasty and the Prosperous Tang Dynasty, as shown in Table 1.

The existing research on pomegranate patterns in the Tang Dynasty mainly focuses on the traceability and development of pomegranate patterns, as well as the study of pomegranate patterns in Dunhuang Mogao Grottoes, while there are few studies on the composition and modern application design of pomegranate patterns in the Tang Dynasty. This paper starts with the composition rules of pomegranate patterns in the Tang Dynasty, summarizes its composition rules and aesthetic characteristics, and uses digital technology to assist in the creation of new pomegranate patterns in the study. On the basis of retaining its original connotation, combined with the current innovative ideas and technologies, the pomegranate patterns in the Tang Dynasty grow with new vitality. On this basis, the establishment of digital application model, and the application of the model to generate new pomegranate patterns used in indoor fabric soft outfit design[6].

Jiang Yunke [3] studied the types of pomegranate patterns in Tang Dynasty in detail. On the basis of this, this paper defines the types of pomegranate patterns and selects the research samples. Taking the Tang Dynasty pomegranate patterns in Hejiacun gold and silver wares and Mogao Grottoes murals as the research object, a systematic induction and analysis is carried out to effectively extract and summarize the features of the patterns.

4. The Tang Dynasty Pomegranate Pattern Extraction Analysis

The Tang Dynasty has a far-reaching impact on Chinese culture. Many unearthed cultural relics of the Tang Dynasty, because of the long age and the problem of preservation technology, some cultural relics are oxidized, resulting in blurred patterns. Therefore, the research method of the original pattern material in this paper is: on the basis of the original cultural relic pattern, combined with the image data, the original pattern is extracted. This method can not only show the original pattern style to a certain extent, but also analyze the composition law of the original pattern.

The study recombines the aesthetic characteristics and composition rules of the pattern to obtain a new pomegranate pattern that conforms to the law of the Tang Dynasty pomegranate pattern. The content of the digital collection of pomegranate patterns in the Tang Dynasty is: the distinction and feature extraction of pomegranate patterns, the analysis of the overall structure of pomegranate patterns, and the color extraction of pomegranate patterns. The three are reconstructed to form a new pomegranate pattern. The specific steps are as follows: Extract the characteristics of pomegranate patterns to obtain symbolic single pomegranate patterns; the composition rule of the pattern is extracted, and the image is vectorized to extract the color of the pomegranate pattern in the algal well of Dunhuang Mogao Grottoes, forming the pomegranate pattern PANTONG color table. The above results will be digitally applied. The application method is to select each part in the software. The order of selection is: single pomegranate pattern-structure-element-color. Finally, the rotation angle, combination repetition rate and size are set to obtain new pomegranate patterns, which are used in modern design. The process visualization is shown in Figure 3.

4.1 Hejiacun Cultural Relics Pomegranate Pattern Extraction Analysis

Through the collation of pictures and text data of cultural relics in Hejia Village, pomegranate-like patterns and peach-type pomegranate patterns appear in cultural relics in Hejia Village. The two patterns are mostly wrapped or in the center of flowers, which can be subdivided into lotus-type pomegranate patterns and bottle-shaped pomegranate patterns. According to the analysis results, the pomegranate patterns presented in the artifacts of Hejiacun have four characteristics: wrapped, wrapped in the center of the flower, figurative, and lotus petals. Among them, the pomegranate-like patterns and peach-type pomegranate patterns are all wrapped, as shown in Figure 1 below.

<table>
<thead>
<tr>
<th>Image of The Hejiacun Pomegranate Pattern Extraction Analysis</th>
<th>Table 1: Hejiacun pomegranate grain extraction and analysis table</th>
</tr>
</thead>
</table>

4.2 Dunhuang Mogao Grottoes Pomegranate Pattern Extraction Analysis
The types of pomegranate patterns in the Zaojing Pomegranate well of the Mogao Grottoes are eight kinds: peach-type pomegranate patterns, split-petal peach-type pomegranate patterns, lotus-type pomegranate patterns, split-petal pomegranate patterns, split-petal pomegranate patterns, lotus petal pomegranate patterns, honeysuckle-type pomegranate patterns, realistic pomegranate patterns, and pomegranate-like patterns. There are also eight kinds of pattern characteristics: wrapped, figurative monomer, lotus petal wrapped, variant, half shelter, pattern composition, wrapped variant, figurative half shelter, as shown in Figure 2 below, as shown in Figure 2 below.

**Table 2: Pomegranate pattern extraction of Zaojing in Dunhuang Mogao Grottoes**

<table>
<thead>
<tr>
<th>Pattern</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peach-shaped contour</td>
</tr>
<tr>
<td>Rounded contour</td>
</tr>
<tr>
<td>Deformed contour</td>
</tr>
<tr>
<td>Oblate contour</td>
</tr>
<tr>
<td>Lotus contour</td>
</tr>
<tr>
<td>Honeysuckle contour</td>
</tr>
<tr>
<td>Split calyx 1</td>
</tr>
<tr>
<td>Split calyx 2</td>
</tr>
</tbody>
</table>

4.3 Tang Dynasty Pomegranate Aesthetic Feature Extraction

According to the research summary of Table 1 and Table 2, the single elements of pomegranate are summarized: peach-shaped contour, rounded contour, deformed contour, oblate contour, lotus contour, honeysuckle contour, split calyx 1 and split calyx 2, as shown in Figure 4. According to the research contents in Table 1 and Table 2, as well as the extraction of components of single pomegranate patterns, five kinds of single pomegranate patterns can be combined into realistic pomegranate patterns, honeysuckle pomegranate patterns, lotus petal pomegranate patterns and peach pomegranate patterns. Among them, peach pomegranate patterns often appear in the form of wrapping in the combination pattern, and are deformed according to the space formed by the combination pattern.

**Figure 4: Pomegranate aesthetic feature extraction**

5. The Use of Pomegranate Patterns in Combination Patterns

Dunhuang Mogao Grottoes and Hejiacun gold and silver samples comprehensively summarize the development of pomegranate patterns in the Tang Dynasty. Through the research and analysis of the samples, it is found that the composition is divided into five composition patterns: X-type composition, cross-type composition, S-type composition, Y-type composition and ring composition, as shown in Table 3 and Table 4. The circle represents the position of the single pomegranate pattern.

**Table 3: Pomegranate pattern combination structure of Mogao Grottoes**

<table>
<thead>
<tr>
<th>Pattern source</th>
<th>Lining</th>
<th>Line drawing</th>
<th>Composition structure</th>
<th>Composition type</th>
</tr>
</thead>
<tbody>
<tr>
<td>X-type composition</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cross-type composition</td>
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<td></td>
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<tr>
<td>S-type composition</td>
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<tr>
<td>Y-type composition</td>
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<tr>
<td>Ring composition</td>
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</tbody>
</table>

6. Pomegranate Color Extraction

6.1 Dunhuang Mogao Grottoes Pomegranate Pattern Color Extraction

This paper selects the cultural relics samples of Dunhuang Mogao Grottoes to extract RGB color, as shown in Figure 5 below. According to the analysis of the extraction results, it is found that there are more colors in green, brown, black, purple and naked. The research results are compared with the PANTONG color card to obtain the following PANTONG color table, as shown in Figure 7.
Table 5: Color Extraction of Pomegranate Patterns in Zaojing of Dunhuang Mogao Grottoes

<table>
<thead>
<tr>
<th>Pattern</th>
<th>Color Extraction (H, S, V)</th>
</tr>
</thead>
<tbody>
<tr>
<td>...</td>
<td>...</td>
</tr>
</tbody>
</table>

Figure 7: Pomegranate pattern PANTONG color table

7. Modern Design and Digital Application of Pomegranate Pattern

The establishment of the modern design and communication platform of the pomegranate pattern in the Tang Dynasty adds content to the contemporary cultural self-confidence plate, helps to inherit the traditional patterns of the Tang Dynasty, summarizes the evolution law of the pomegranate pattern in the early, prosperous and middle Tang Dynasties, increases the research content of the pomegranate pattern plate, enriches the modern design language, increases the traditional cultural elements in the design discipline, and completes the research on the application and digital application of traditional culture.

7.1 Building a Digital Application Process

According to the study of Figure 4, the following five kinds of single pomegranate patterns are combined: realistic pomegranate pattern, honeysuckle pomegranate pattern, lotus petal pomegranate pattern, and peach pomegranate pattern, as shown in Figure 7. According to the research content of Table 3 and Table 4, five kinds of composition forms are summarized: X-type composition, cross-type composition, ring-type composition, S-type composition and Y-type composition. The X-type composition is divided into two forms, square and honeysuckle composition, and the circle represents the position of the single pomegranate pattern. According to the patterns summarized and extracted in the above table, the combination pattern with the single pomegranate pattern is extracted, as shown in Table 6.

The digital application process is mainly divided into four parts: single pomegranate pattern, structure, combination pattern and color. Use steps are: after selecting a single pomegranate patterns, single pomegranate patterns internal pattern selection, the formation of preview graphics and repeat the number of settings, and then constitute the structure and combination of pattern selection, and in the color library to select the desired color, set the size and repetition rate. When choosing the combination structure, the square composition and the square pattern are matched, the circular composition and the circular pattern are matched, and the mismatched pattern becomes gray. As shown in the column of the combination description in table 6, the position of the black solid point is the position of the matching pattern. From this process, the pomegranate patterns of the new Tang Dynasty are derived. Such methods are suitable for the re-innovation of pomegranate patterns, and have certain universality for the application of traditional patterns in modern design. An example scheme is derived from the above method, as shown in Figure 10.

Table 6: Combination element icons

Figure 8: Platform Construction Logic

Now build a digital platform, by the home page, pattern production, my three major components, in the home page is divided into works show search, works show including recommendation and attention designer dynamic two parts; pattern production is divided into monomer, structure, combination of patterns, color selection of four parts; My
includes user information, my works, data. Set the order for the image-set-preview-export-release digital process, according to the law of the Tang Dynasty pomegranate constitute a modern new pomegranate pattern, into the imprint of the present era, as shown in Figure 8.

7.3 Digital Platform Design Show

The design of digital platform consists of APP entry page, login page, pattern making page and 'my' page. After entering the pattern making page, select the single pomegranate pattern, enter the selection of the combination pattern, form a mature single pomegranate pattern, set the number of single repetitions, enter the combination structure page, adjust the size and set the number of structural repetitions, and finally select the color. A graphic preview can be seen below the mobile screen. This method can be combined into new pomegranate patterns with different characteristics of the Tang Dynasty pomegranate pattern. In the 'My' page, you can see the collection, like and publish your own pattern options. The exported patterns can be used in the design through modern design methods to enrich the design connotation, as shown in Figure 9.

7.4 Application of Reconstructed New Pomegranate Pattern in Interior Fabric Soft Decoration

Soft cloth art has both practical functions while having a certain sense of decoration and atmosphere. The carrier is selected as the cloth sofa, bedroom bed cover and pillow. The new pomegranate pattern reconstructed by digital application is applied to the above three carriers, and the design is carried out by the modern design method of repetition, amplification, rotation and local application, so that the soft cloth art inherits the culture without losing the modern style, as shown in Figure 11.

The basis for the modern design and deformation of the pomegranate pattern in the Tang Dynasty is to summarize the composition rules of the pomegranate pattern in the Tang
Dynasty through research. The three parts of the single pomegranate pattern, the composition rule and the combination pattern are put into the construction platform. According to the law of the study, the new pomegranate pattern is synthesized and used in the indoor fabric soft decoration, so that the user’s living environment is more cultural.

Figure 11: Reconstruction of the application of new Tang pomegranate pattern in indoor soft decoration

8. Conclusion

The formation and development of the pomegranate pattern in the Tang Dynasty was influenced by cultures around the world. It embodies the epitome of the Tang Dynasty culture, also brings together the aesthetics of the predecessors, exudes the unique charm of traditional culture, and is a valuable cultural heritage of the Chinese nation. Starting from the essence of the composition of pomegranate patterns in the Tang Dynasty, this paper explores its combination rules and builds a universal digital design platform. In the era of science and technology, it is an effective way to modernize the traditional patterns. The platform is used to synthesize the pomegranate patterns of the new Tang Dynasty and apply them to the indoor soft decoration fabric, that is, without losing the charm of the traditional Tang Dynasty pomegranate patterns, it can better enable modern users to accept the emergence of traditional cultural elements in life.

In summary, this paper studies the combination of traditional decorative patterns and modern decorative art through digital means. On the one hand, it explores the universality of the inheritance and application methods of traditional patterns, and on the other hand, it provides new ideas for the application of traditional patterns in the process of indoor soft cloth art, so that traditional culture can not be lost in the modern aesthetic context.

References