Image Extraction of National Intangible Cultural Heritage Ningbo Mud-Gold Color Paint and Its Innovative Application in 3D Fashion Design

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Abstract: In the process of social development and progress, people pay more attention to the knowledge and cultural heritage contained in intangible cultural heritage. With the continuous development of digital technology, the protection and inheritance of intangible cultural heritage have begun to adopt new technical means. This study focuses on the national intangible cultural heritage of Ningbo Gold Lacquerware, exploring its image extraction and the analysis of its implied symbolism. The extracted images of Ningbo Gold Lacquerware are digitized for 3D garment design, demonstrating the unique charm and innovative application of Ningbo Gold Lacquerware in fashion through practical cases. This study aims to provide new ideas and methods for integrating traditional patterns with digital clothing design, while also promoting the diversified inheritance and development of intangible cultural heritage.
Keywords: Ningbo Mud-Gold Color Paint, National Intangible Heritage, Image Extraction, Digitization, Clothing Innovative Design.

1. INTRODUCTION

Ningbo Gold Lacquerware is one of China's intangible cultural heritages, renowned for its unique craftsmanship and rich imagery (patterns) symbolism. The Ningbo Gold Lacquerware technique is primarily popular in the “The Ten-mile Red Dowry” marriage culture of Ningshao Plain of Zhejiang Province, China. "The Ten-mile Red Dowry" is a traditional wedding custom in the Ningshao Plain that originated in the Southern Song Dynasty and flourished during the Ming and Qing Dynasties. This custom depicts the lively scenes of a wealthy family during weddings, with the grand procession of the bride and her dowry stretching for dozens of miles in a festive display of red, which is spectacular and is referred to as " The Ten-mile Red Dowry." Among the many items in this grand procession, one category of colorful folk traditional crafts is indispensable: the "gold

lacquerware." This craft is a type of decorative technique on lacquerware that combines clay, gold, and colorful lacquer craftsmanship. Since it is most prevalent in Ningbo, Zhejiang Province, it is also known as "Ningbo Mud-Gold Color Paint.

2. THE HISTORY OF NINGBO MUD-GOLD COLOR PAINT

The history of "Ningbo Mud-Gold Color Paint" dates back to the Hemudu culture period, 7,000 years ago. Archaeologists excavated an inner red, outer black lacquer bowl from the Hemudu ruins, which is the earliest prototype of gold-painted lacquer wood-style lacquer. This craft reached its heyday during the Ming and Qing dynasties. The "Zhejiang Tongzhi" records: "During the Xuande years of the Ming dynasty, Ningbo Mud-Gold Color Paint was famous in China and abroad." The Ninghai "Ten Mile Red Dowry" Museum houses a collection of Ninghai folk lacquer furniture from the Qing Dynasty, including a dragon and phoenix red board box and large wooden sleeping beds, which showcase the glorious history of this lacquer. Ningbo, located in the southeast coastal area and one of the earliest commercial ports in China, benefited from trade prosperity, creating favorable conditions for the reputation of Ningbo Mud-Gold Color Paint (Tao, 2017).

3. NINGBO MUD-GOLD COLOR PAINT CRAFT CHARACTERISTICS AND USES

Ningbo Mud-Gold Color Paint is crafted with exceptional skill, resulting in a brilliant, colorful appearance, particularly striking in the vermilion trousseau where it appears glittering. The main raw materials used are raw lacquer and gold foil. Lacquerware is primarily made with wooden bases, but bamboo slices and bamboo weaving are also used. Depending on the pattern's degree of concavity and convexity, production can be classified into three categories: flat flower, sunken flower, and floating flower. Creating an exquisite lacquer piece typically involves more than 20 procedures, including tracing, pounding lacquer clay, stacking, applying gold, overlaying lacquer, and applying color. In 2011, this lacquerware was included in the "Third Batch of National Intangible Cultural Heritage List." Ningbo Mud-Gold Color Paint is one of the most prominent traditional techniques in China's arts and crafts, boasting a long history and a variety of colorful products. These include furniture, hanging screens, plaques, and

small household items such as offering boxes, fruit plates, hand stoves, square jewelry boxes, octagonal rice buckets, wine containers, tea buckets, and drums. The lacquerware is also used in furniture pieces like beds, cabinets, and sedan chairs (Crina Anca Sandu et al., 2011).

4. THE NINGBO MUD-GOLD COLOR PAINT PATTERN AND THE IMPLICATION OF SYMBOLISM

The traditional craftsmanship of Ningbo Mud-Gold Color Paint relies heavily on a variety of decorative patterns, each unique to different periods and influenced by the era's specific techniques and styles. The clay gold lacquer decorative pattern designs have several distinctive characteristics: Firstly, the choice of subject matter is broad, encompassing people, animals, plants, flowers, landscapes, pavilions, religious themes, and auspicious motifs. For example, peony patterns often represent richness and splendor, while the "four gentlemen"—plum, orchid, bamboo, and chrysanthemum—symbolize noble character. Additionally, motifs like pumpkins, pomegranates, and peaches express wishes for good fortune, many children, and longevity. Secondly, the organizational structure of these patterns is typically symmetrical and suitable for individual motifs, with continuous patterns being less common. The compositions are free, clear, elegant, simple, and colorful. The clay and gold lacquer piling effect adds a strong sense of three-dimensionality, making the designs appear exquisite and gorgeous. Furthermore, the decorative patterns of Ningbo Mud-Gold Color Paint have evolved unique styles over different periods. The motifs and meanings have profound cultural connotations and historical backgrounds. For example, patterns on wedding and daily necessities often reflect parents' wishes for their children's future happiness. During the Ming and Qing dynasties, auspicious patterns and harmonious wordplay were commonly used to symbolize good wishes such as joy, prosperity, and fulfillment. There are many homophonic patterns such as "Happiness at Your Eyebrows," "Abundance Year After Year," and "Everything Goes Well." These patterns are not only decorative but, more importantly, they convey symbolic meanings and blessings. In modern times, the application of Ningbo Mud-Gold Color Paint has expanded beyond traditional trousseau and wooden items. The decorative techniques are now used on ceramics, shells, jade, and other materials, broadening their scope. The subject matter of the patterns continues to innovate, keeping pace with modern aesthetics and meeting contemporary

needs.

5. NINGBO MUD-GOLD COLOR PAINT IMAGE EXTRACTION AND ANALYSIS

5.1 Extraction and Analysis of Patterns on The Embroidered Stool of Ningbo Mud-Gold Color Paint Works

The piece comes from the Ningbo Oriental Art Museum in Ninghai County, Ningbo City, Zhejiang Province. The embroidered stool, also known as a sitting stool, is a traditional Chinese furniture piece with a highly personalized design. It is round with a large belly and smaller top and bottom, resembling an ancient drum, which is why it is also called a drum pier. The terms "pier" and "stool" are synonymous in this context. The embroidered pier has a long history. According to Mr. Shen Congwen in his "Study of Ancient Chinese Dress," the waist drum-shaped pier has been a special seat for women to warm themselves with incense since the Warring States period (Figure 1). The image on the embroidered pier depicts the classic Chinese motif "Support the Husband and Educate the Children," an idiom meaning to assist the husband and educate the children. This phrase was historically a measure of a woman's moral level and a compliment to a virtuous wife. Based on the "mothering skills" decorative pattern on the embroidered pier, we used Photoshop's "Cutout" tool to extract the image and the "Fill" tool to apply various color schemes. Some patterns were further processed with line drawing and dark effects to create different visual impacts. These patterns can be applied to various design products, such as T-shirts, or in the creation of clothing styles that combine traditional and modern elements (Na & Sharudin, 2024).

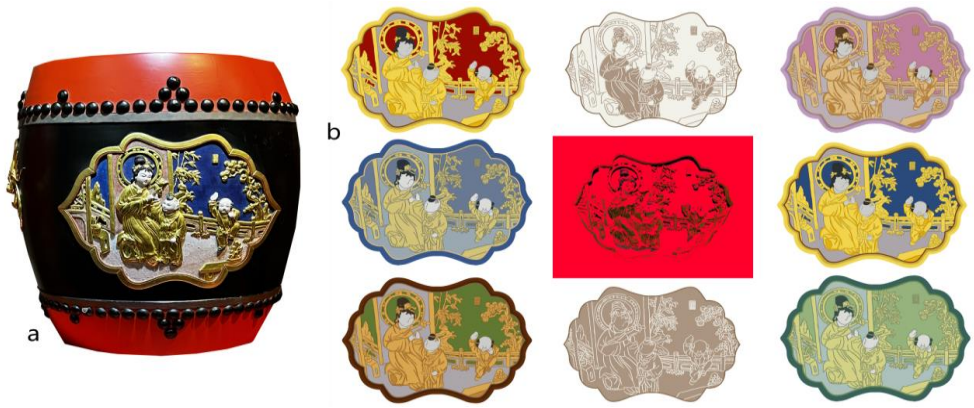

Figure 1(a): Embroidered Stool and the Image of "Supporting the Husband and Educating the Children" Decorated With the "Ningbo Mud-Gold Color Paint" Technique. **(b)** Series of Designs Based on the Image of "Supporting the Husband and Educating the Children"

5.2 Image Extraction and Analysis of the "Pollen Dipper" on Ningbo Mud-Gold Color Paint Work

The "Huafen Aodou" is a tool that ancient women used to make rouge and face powder. Some exquisitely crafted Huafen Aodou have gold leaf applied to their surfaces and are decorated with piled-up auspicious flowers, symbolizing the graceful beauty of women from Jiangnan. Particularly, those made for and decorated by high-ranking officials and nobility are even more intricate and delicate. This piece (Figure 2-a) was created by Mr. Li Guangzhao, the first-generation inheritor of Ningbo Mud-Gold Color Paint after the founding of the People's Republic of China. It has a wooden base and measures 11 cm in width and 20 cm in height. The decorations, made using the Ningbo Mud-Gold Color Paint "floating flowers" piling technique, feature various plants. The overall shape resembles a goose, symbolizing bravery, loyalty, and good fortune. The decorative patterns are based on traditional and classic Chinese plants and fruits, arranged in a ring around the vessel. The first image on the lid is a persimmon (Figure 2-b), which symbolizes harmony and fulfillment, playing on the homophone "persimmon" for "as one wishes." On the side, there are orderly "piles" of rose grape (Figure 2-c), representing good luck and happiness.

The lotus flower (Figure 2-d) often describes a kind and beautiful girl, pure love, and noble feelings. It symbolizes a character that remains pure and unsullied despite being in a corrupt environment. The image of a peach (Figure 2-e), symbolizing longevity and health, reflects aspirations for a better life. The "Happiness at Your Eyebrows" image (Figure 2-f): In Chinese folklore, magpies often symbolize joyful events. The word "plum" sounds like "eyebrow", hence the phrase "Happiness at Your Eyebrows," which describes a person beaming with joy. It also signifies the arrival of spring and the occurrence of happy events. The pomegranate (Figure 2-g) symbolizes many children and good fortune, indicating family prosperity and flourishing.

The twining branch pattern (Figure 2-h-i), known as the "twining flower" or "longevity vine," due to its continuous structure, signifies "endless life" and implies auspiciousness. The "joy from the sky" image (Figure 2-j) depicts a dancing child surrounded by magpies, auspicious clouds, and flowers, symbolizing joyful events coming from the sky, a common auspicious motif in Chinese folklore. Finally, the goose-like handle and butterfly on top (Figure 2-k) symbolize freedom and change in Chinese culture, implying sweet love (Chen et al., 2021).

Figure 2: "Huafen Aodou" and Image Analysis (a: Huafen Aodou b: Huafen Aodou lid and persimmon image c: Precious rose grape image d: Lotus flower image e: Peach image f: "Happiness at Your Eyebrows" image g: Pomegranate image h: Twining flower image i: Twining flower image j: "Joy from Heaven" image k: Goose-shaped handle and butterfly image)

From the above analysis, the images of Ningbo Mud-Gold Color Paint are characterized by decorative themes and compositions that express auspicious symbols, and the people's visions of wealth, peace, health, and constant happiness are the core, revealing strong folklore interests in the beautiful blessings.

6. IMAGE EXTRACTION AND PATTERN DESIGN OF NINGBO MUD-GOLD COLOR PAINT

6.1. Image Extraction Methods and Steps

For extracting each image from the " Huafen Aodou" as an example, Adobe Photoshop drawing software is utilized. Below are the steps to follow:

(1) Open Photoshop software, go to the "File" menu, select "Open," then browse and choose the file containing the "Huafen Aodou" images, and click on "Open."

(2) Use the "Magic Wand Tool" or "Quick Selection Tool" for keying. Begin by selecting the part of the image from the "Huafen Aodou." If there is a high contrast between the background and the object, the Magic Wand Tool will be easier to use. For finer control, the Quick Selection tool can be employed.

(3) With the image selected on the "Huafen Aodou", right-click on the selection area, and choose "Select Inverse" to select the background.

(4) Press the "Delete" key to remove the background. This should extract the image on the "Huafen Aodou". Repeat this process to extract each image from the "Huafen Aodou." If further optimization of the

extracted image is required, the "Eraser Tool" or 'lasso' can be used.

(5) Once extraction is complete, go to the "File" menu, select "Save As," choose the desired format and location, and save the extracted image.

The above steps outline the basic process of extracting the "Huafen Aodou" image using Adobe Photoshop. Depending on the specific image characteristics, adjustments and optimizations may be necessary. Figure 3 demonstrates the extraction of images from the "Huafen Aodou" and the effect of splicing (He et al., 2021; Wu, 2021).

Figure 3: Image Extraction from "Huafen Aodou". a: Peach image b: Precious lotus flower and lotus flower image c: Twining flower image d: Persimmon image e: Pomegranate image f: Butterfly image

6.2. Line Drawing Extraction and Color Filling

6.2.1 Extracting Image Line Drawing in Adobe Photoshop from "Huafen Aodou"

To extract the line drawing from the "Huafen Aodou" in Adobe Photoshop, follow these steps: Select the "Image" menu, then choose "Adjustments," and select "Threshold." Adjust the parameters until the image displays clear lines. If further optimization of the extracted lines is needed, use the "Eraser Tool" or "Lasso Tool" for fine-tuning. Alternatively, you can manually draw the image line drawing by creating a new layer and using hand-painted board and pencil tools. Pay attention to drawing the structure of the image clearly, simplifying some parts of the structure if necessary (Figure 4).

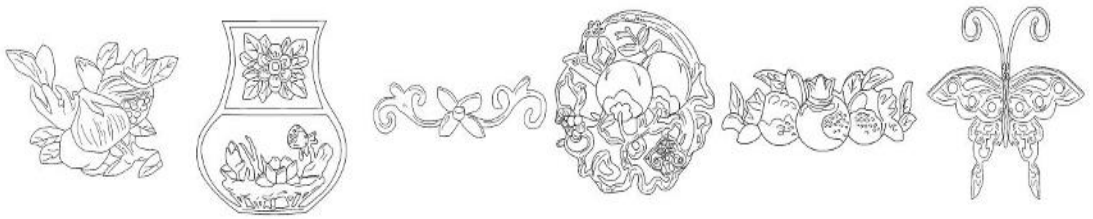

Figure 4: Image Line Drawings on "Huafen Aodou" a: Peach image b: Rose grape and lotus flower image c: Twining flower image d: Persimmon image e: Pomegranate image f: Butterfly image

6.2.2 Filling Color for the Extracted Image

The steps for filling color in the extracted "Huafen Aodou" line drawing in

Adobe Photoshop are as follows:

1) Adjust the line drawing. If the lines are unclear or need adjustment, use the "Image" menu and options such as "Threshold" or "Brightness/Contrast" to optimize the lines.

2) Create a new layer. Right-click on the line drawing layer in the Layers panel and select "Duplicate Layer" or drag the layer to the "Create New Layer" button to create a copy of the line drawing. This way, coloring can be done without affecting the original line drawing.

3) Lock Transparent Pixels. Click on the "Lock Transparent Pixels" icon (a lock and a transparent square icon) at the bottom of the Layers panel on the duplicated artwork layer to ensure that color is only applied to non-transparent areas of the line.

4) Select the color fill tool. Choose the "Paint Bucket Tool" or "Gradient Tool" depending on whether you want a solid color fill or a gradient fill.

5) Set the fill color options. Set the foreground color for solid fills or gradient color for gradient fills below the toolbar. If pattern filling is desired, select "pattern filling" in the options bar of the Paint Bucket Tool and choose a pattern.

6) Fill in color. Click on an area inside the artwork with the Paint Bucket Tool or drag the mouse across an area of the artwork with the Gradient Tool to fill in color or gradient.

7) Refine coloring. For more detailed coloring, use the "Brush Tool" to draw on the new layer.

8) Adjust layer blending mode. To adjust the fill color and blending effect with the lines, try changing the fill color layer blending mode, such as using "Multiply" or "Color" mode.

These steps outline the basic process of coloring the extracted artwork in Adobe Photoshop. Figure 5 demonstrates the image line drawing and coloring effect on the "Huafen Aodou (Lu & Lee, 2024; Yang, 2013)."

Figure 5: Line Drawing and Coloring Effect on "Huafen Aodou" a: Peach image b: Rose rape and lotus flower image c: Twining flower image d: Persimmon image e: Pomegranate image f: Butterfly image

6.3. Extraction and Design of Images on the "Huafen Aodou"

After extracting various auspicious floral images from the "Huafen Aodou", the innovative design of the pattern through the composition of bipartite continuous pattern and quadripartite continuous pattern is a combination of natural elements and traditional art forms, which can create a variety of novel and culturally rich pattern design works.

6.3.1 Innovative Design of Bipartite Continuous Pattern

(1) Bone method selection: There are various forms of bone methods for bipartite continuous patterns, such as vertical, scattered, and ripple. Choose the appropriate bone method based on the characteristics of the extracted flower image as the foundation of the design. For instance, if the flower image features smooth lines and elegant forms, the corrugated bone method can be selected to reflect its sense of rhythm.

(2) Unit pattern design: Utilize the extracted flower images as elements and design one or more unit patterns. These unit patterns can consist of complete flower images, or partial or abstract forms of flowers. Ensure that the unit pattern is simple, beautiful, and possesses a certain degree of recognition and uniqueness.

(3) Continuous arrangement: According to the selected bone method, continuously arrange the unit pattern in the upward and downward or left and right directions. During the arrangement process, pay attention to the articulation and transition between unit patterns to ensure the coherence and harmony of the overall pattern.

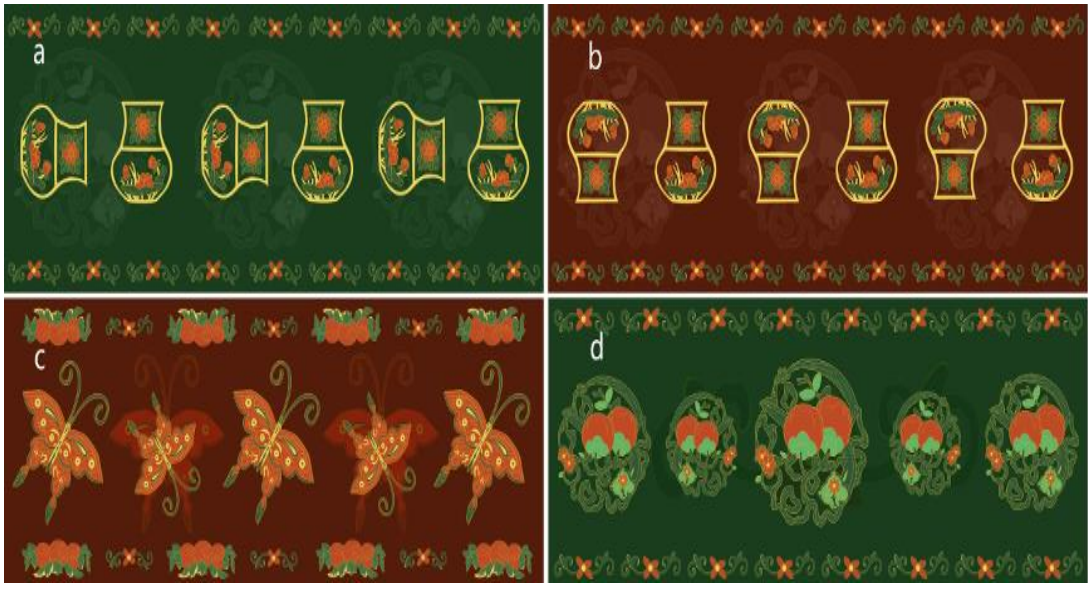

Figure 6: Design Proposal for Bipartite Continuous Pattern

Above, a, b, c, and d represent the four schemes of bipartite continuous

pattern design (Fig. 6). The design concept for schemes a and b is to extract the colors of the artifacts, with red and green as the main colors and dark green as the background. The gold tracing technique is preserved, with yellow and light green as secondary colors. The edges are arranged in a regular and orderly manner with multiple monolithic patterns, while the main pattern resembles a vase, arranged in various ways. The background is lightened to create contrasting interspersed areas, and the colors and forms of each pattern intertwine, reflecting a classical beauty. The design concept for scheme c is also centered on extracting the colors of the artifacts, with red and green as the main colors and dark red as the background. The gold tracing technique is retained, with yellow as the secondary color. Two different patterns are used on the edges, with the main pattern being a butterfly pattern featuring changes in direction and size. The background patterns are superimposed and interspersed, with each pattern's color and form mirroring each other, creating a sense of rhythm and rhyme and a rich, varied aesthetic. Scheme d's design concept revolves around extracting the colors of the artifacts, with red and green as the main colors and dark green as the background. The gold tracing technique is preserved, with light green as the secondary color. The edges are arranged in a continuous pattern of individual flowers, while the main pattern consists of vine fruit, creating variations in size. The background is lightened, contributing to a sense of rhythm and rhyme and enhancing its classical beauty.

6.3.2 Innovative Design of Quadrilateral Continuous Pattern

(1) Selection of Composition Mode: The composition modes for the quadrilateral continuous pattern include scattered composition, dislocation composition, and overlapping composition. Based on the design requirements and the characteristics of the flower image, select the appropriate composition mode.

(2) Expansion of Unit Patterns: Expand and deform the unit patterns in the bipartite continuous pattern to adapt them to the composition mode of the quadrilateral continuous pattern. Ensure that the expanded unit patterns are more adaptable to the effect of large-area spreading while retaining their original features.

(3) Quadrilateral Continuous Arrangement: Arrange the unit patterns continuously in the four directions of up, down, left, and right, according to the selected composition. During the arrangement process, pay attention to the balance and coherence of the pattern to avoid overcrowding or emptiness.

Figure 7: Quadrilateral Continuous Design Scheme

The above designs labeled as a, b, c, and d represent the four schemes of the quadrilateral continuous pattern design (Figure 7). The design concept for scheme a is to extract the colors of the artifacts, with red and green as the main colors, dark green as the background, retaining the gold tracing technique, and using yellow as a secondary color. The overall pattern arrangement is centripetal, with diagonal corners on the edges. The size of the main pattern edges is staggered, and the background fades to create visual contrast between shades, achieving uniformity and coherence, and a rhythmic overall effect. Scheme b's design concept is to extract the colors of the artifacts, with red and green as the main colors, crimson as the background, retaining the gold depiction technique, and using yellow as a complementary color. The overall pattern arrangement is centripetal, with a vase-style central pattern. The lightened background enhances the visual contrast, adding more spatial depth and enhancing the beauty of the flowers. Scheme c's design concept is to extract the colors of the artifacts, with red-green as the main colors, reddish-brown as the background, retaining the gold tracing technique, and using yellow as a complementary color. The overall pattern is arranged in a centripetal manner, with butterflies of different sizes on the edge as a background, staggered in size and simple yet generous (Chakraborty & Biswas, 2020). The background's black and red shadows create visual contrast, making the main body prominent and colorful. Scheme d's design concept is to use red and green as the main colors, with light yellow as the background, giving an elegant and fresh feel. The gold technique is retained, with yellow and light green

as secondary colors. The overall pattern arrangement is square and round, with the main body larger and surrounded by butterflies and flowers, adding visual aesthetics, regularity, and spatial depth. In addition to maintaining the traditional composition of bipartite and quadripartite continuous patterns, we can incorporate innovative elements and design concepts. For example, unit patterns can be simplified or deformed using modern design techniques and styles. Other cultural elements or symbols can also be introduced and combined with auspicious flower images to create designs with more individuality and cultural connotations. Through the steps outlined above, utilizing auspicious floral images extracted from the "Huafen Aodou", innovative designs are created through the composition of bipartite and quadripartite continuous patterns. These designs not only preserve the flavor and beauty of traditional art forms but also integrate modern design concepts and creative elements, resulting in works with high artistic value and practicality.

7. INNOVATIVE APPLICATIONS IN 3D CLOTHING DESIGN

Applying the designed continuous pattern to 3D clothing design requires the use of 3D design software, such as Zhejiang Lindi Technology Co.'s Style 3D software. The pattern can be applied to the garment model as a texture map, requiring adjustments to the size, orientation, and position of the pattern to ensure it matches the 3D shape of the garment. For example, the image extracted from the "Huafen Aodou" and designed as a bipartite and quadripartite continuous pattern is innovatively applied to a fishtail skirt suit:

7.1. Fishtail Skirt Suit Design

When designing a fishtail skirt suit, it's important to consider whether the style will utilize bipartite continuous pattern, quadripartite continuous pattern, individual patterns, or a comprehensive application of patterns. Full consideration should be given to how the patterns can be combined with various parts of the garment, such as the body and hemline. Some details may need to be adjusted multiple times to achieve the best effect in clothing modeling (Alraouf, 2024).

7.2. Fishtail Skirt Suit 3D Modeling

To begin 3D modeling of the fishtail skirt suit, open the Style 3D software, select the model, and import it. For this application, a 3D model

with a height of 178cm, waist 64cm, and shoulder width of 40cm is selected. After selecting the model, import the fishtail skirt suit sample in DXF format and modify it according to the model's size. Use the plate editing tool in the Style 3D software to adjust the length of the garment and the amount of looseness by moving the plate's edge (Figure 8). Adjust the skirt split line using the Edit Curve and Add Point tools. Rearrange the sample for the model in the 3D viewport using the Model Arrangement Points tool, and move the plate to the appropriate position using the Positioning Ball tool and the Arrangement property in the Attribute Edit viewport. Use the Thread Sewing and Free Sewing tools to sew the parts that need to be sewn in the 2D viewport. Check the sewing lines in the 3D viewport, and if there are any errors, use the Edit Sewing tool to make alignment adjustments (Vanderploeg et al., 2017).

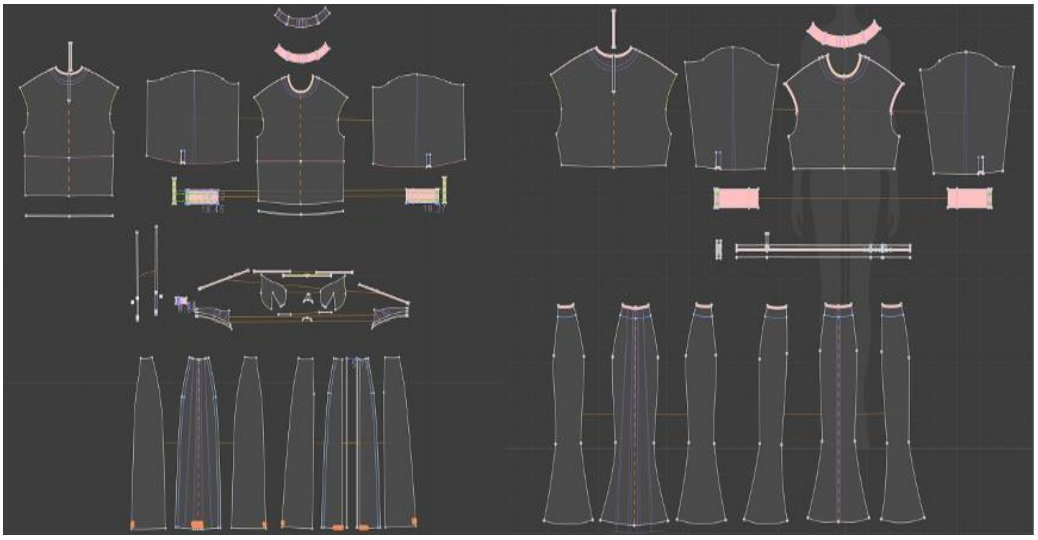

Figure 8: Open the Style 3D Software, Import the DXF Format Template, and Use the Editing Plate Tool to Adjust the Template.

In the Style 3D software, utilize the Edit Plate tool to adjust the length and looseness of the garment by moving the net edge of the plate. Adjust the garment's length to 40cm, the waist to 66cm, and the skirt's length to 76cm. Utilize the Edit Curve and Adding Points tools to make adjustments to the skirt segmentation line (Liu et al., 2024). Then, rearrange the pattern for the model in the 3D viewport using the Model Arrangement Points tool, and position the panels correctly using the Positioning Ball tool and the Arrangement Properties in the Attribute Edit viewport. Next, use the Thread Sewing and Free Sewing tools to sew the parts needing stitching in the 2D viewport, which can be synchronized with sewing line checking in the 3D viewport. If any errors arise, utilize the Edit Sewing tool to make alignment adjustments (Figure 9) (Chen, 2013).

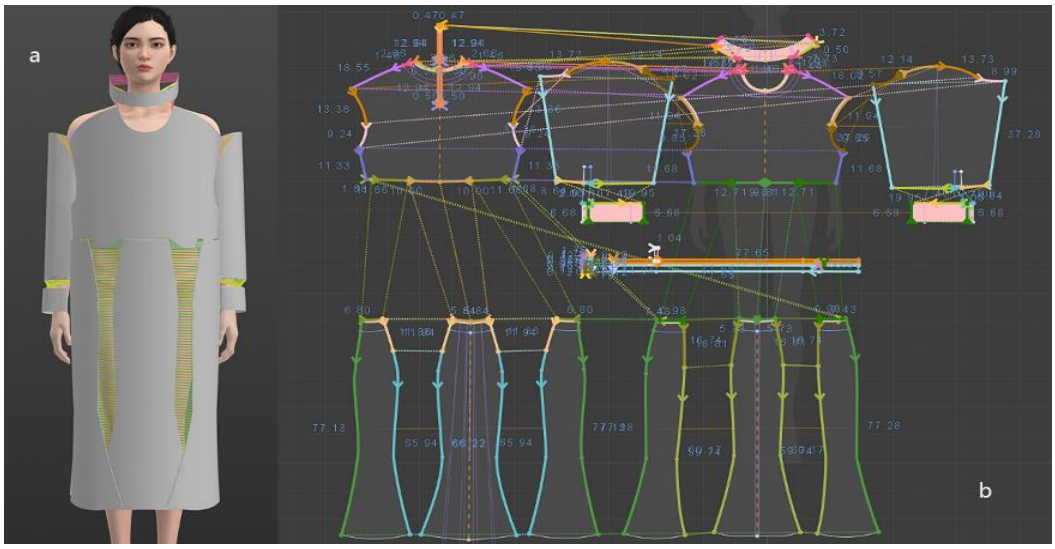

Figure 9: a: Conduct Stitching Line Checks in the 3D Viewport; If There are Any Errors, Use the Edit Sewing Tool for Alignment Adjustments. b: Utilize the Thread Sewing and Free Sewing Tools in the 2D Viewport to Sew the Parts Requiring Stitching.

7.3. Innovative Application of "Huafen Aodou" Pattern in Fishtail Skirt Suit

Firstly, import the designed pattern into the 3D design software and precisely adjust the layout according to the style and structure of the garment. Then, select the fabric used in the garment from the fabric column, add the drawn bipartite continuous or quadripartite continuous pattern of "Huafen Aodou" to the texture in the attribute editing window, and complete the application of the pattern and morphological changes in the garment by adjusting the mapping method, editing the picture, changing the color, and adjusting the size and angle of the texture parameters.

Next, use the Bright Line Tool and Insert Tool to add detailed designs to the garments, enriching the structure and color matching. In the pattern window, import the pattern and position it on the plate for printing with the pattern tool (Zhou, 2024). Adjust the size of the pattern with the Adjust Pattern Tool. In the attribute editing window of the pattern, adjust the pattern size, rotation angle, and color, and also refine the pattern process to create different pattern effects. Through various parameter adjustments, a variety of matching schemes can be realized. Utilizing the functions of 3D design software, simulate the three-dimensional effect of the garment and observe the rendering effect of the pattern on the garment. Necessary modifications and optimizations can be made accordingly (Figure 10).

Figure 10: Innovative Applications of "Huafen Aodou" Pattern in Fishtail Skirt Suit

Innovative applications in 3D clothing design can manifest in various ways, such as experimenting with new ideas and elements in pattern design, seamlessly integrating bipartite and quadripartite continuous patterns with other design elements, or innovating in clothing styles and structures, harmonizing patterns with the garment's style and structure to produce distinctive and creative clothing pieces (Tao, 2017). In conclusion, the design of bipartite and quadripartite continuous patterns, derived from the image extraction of Huafen Aodou, and their innovative application in 3D garment design, offer a fresh interpretation of the image elements found in Ningbo Mud-Gold Color Paint. These traditional patterns are deftly merged with modern aesthetics to yield a series of unique clothing designs. Not only do these creations showcase the distinctive charm of intangible cultural heritage, but they also infuse modern clothing design with new vitality and creativity, rendering the patterns more contemporary and captivating (Yen & Hsu, 2017).

8. CONCLUSION

To summarize, the extraction of images from the national intangible heritage Ningbo Mud-Gold Color Paint and their innovative application in 3D clothing design not only represents the preservation and promotion of traditional culture but also signifies the expansion and deepening of modern design concepts. Through comprehensive research and image extraction of Ningbo Mud-Gold Color Paint, we not only preserve the unique charm of this traditional art form but also infuse it with new vitality. In the realm of 3D clothing design, the innovative use of Ningbo Mud-

Gold Color Paint images not only enriches the elements and expressions of clothing design but also opens up new avenues and ideas for clothing design. This innovative application not only revitalizes Ningbo Mud-Gold Color Paint images in modern society but also imbues clothing design with greater cultural significance and artistic value. Looking ahead, we anticipate the continued innovative application of traditional cultural elements in modern design, bringing more beauty and depth to our lives.

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