



Innovative Analysis of Emblem Ink Mold Pattern Based on Style Transfer Algorithm and 5G Network

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<i>Article History</i>	<i>Abstract</i>
Received: 01 July 2023 Revised: 12 August 2023 Accepted: 27 September 2023	Aiming at the problems of poor pattern innovation analysis and difficult pattern innovation, a pattern innovation method based on Huimo ink mold is proposed. In the process of making the pattern analysis of the emblem ink mold, the complex design process of innovative analysis and design, as well as the massive analysis data, need to be analyzed with the help of intelligent algorithms. At the same time, wireless network technology has less application in Huimo ink molds, which affects the development of traditional Huimo skills. Therefore, this paper proposes an innovative method of emblem ink mold pattern based on a style transfer algorithm, which innovatively designs different styles of emblem ink mold patterns and extracts the framework elements of innovative patterns. Firstly, the style transfer algorithm is used to collect the relevant data for the creation of the ink mold pattern, and the data of different styles are summarized through the 5G network and multimedia network, and the ink mold pattern is carried out according to the style transfer characteristics of division, innovation of innovation. Then, according to the style transfer algorithm, the style transmission is carried out in combination with the multimedia network to promote the feature extraction of the ink mold pattern. The research results show that with the support of multimedia network technology, the style transfer algorithm can improve the innovation level of emblem ink engraving patterns and promote the development of the emblem ink creation process.
CC License CC-BY-NC-SA 4.0	Keywords: <i>Style Transfer Algorithm, Huimo, Ink Molds, Innovation, Multimedia Networks</i>

1. Introduction

Multimedia network sends signals on multimedia technology and network technology, with the speed and distance of enhanced signal transmission, to achieve long-distance processing of massive data, and can effectively improve the transmission speed of text, sound, and pattern data [1]. However, in multimedia network transmission, there are often problems with complex data and frequent interference, which affect the innovative analysis of ink mold patterns [2]. To this end, this paper combines the style transfer algorithm with the multi-media network to promote information flow control and standardize the flow of data from hardware to software to improve the effectiveness of data transmission [3]. The characteristics of different styles and patterns are analyzed, and the valuable values are extracted for better integration.

2. Related Works

2.1 Different Style Innovation of Ink Mold Pattern Data

Style innovation is primarily driven by developments in content, engraving techniques, and structural approaches. When applying a style transfer algorithm, it's crucial to analyze and extract key feature data and engraving content. This process involves minimizing style elements that are incongruent with the Huimo culture. Instead, it focuses on integrating values of correlation, influence, and development into various style collections, as noted in source [4]. This synergy between style innovation and style transfer algorithms facilitates the transmission of extensive style data while simultaneously reducing network transmission loads, as detailed in source [5]. Specifically, the algorithm can adjust for frequency matching, set endpoints, and regulate the data transmission volume concerning Huimo's cultural heritage and pattern styles. The details of this transmission process are further elaborated in source [6].

Style data of ink mold pattern: ink mold pattern data is f_2 , engraving technique characteristics is f_1 [7], engraving structure characteristics is B , pattern style calculation function is W , and the consistency of features is N , the style data collection for the ink mold pattern is shown in Equation (1):

$$W = \sum f_2 - f_1 \quad (1)$$

Under these conditions $B=1/s$ [8], formula (1) can evolve into formulas (2), (3) and (4).

$$W = \sum f_2 - \log_2 f_1 \quad (2)$$

Or

$$W = \sum f_2 - 2 \cdot W \cdot \log_2 f_1 \quad (3)$$

And or

$$W = \sum \frac{f_2}{s} - 2n \cdot W \cdot \log_2 f_1 \quad (4)$$

2.2 Research Hypothesis

From the above formula, the style innovation of the ink mold pattern can be realized, and the multimedia network channel selection can be carried out according to the characteristics to improve the transmission efficiency of the features.

Ink mold pattern innovation evaluation: weight ranking function is d , feature influence degree calculation function is p_i , style index fusion degree ranking is $Q(x_i)$, style transfer algorithm sorting result is a , style index sorting is shown as follows:

$$Q(x_i) = \sum_{i=1}^n d p_i - \text{sum}(a \cdot x) \quad (5)$$

Or

$$Q(x_i) = \sum_{i=1}^n d p_i - \text{sum}(a \cdot x) \cdot W \quad (6)$$

And or

$$Q(x_i) = \sum_{i=1}^n d p_i \cdot f_1 - \text{sum}(a \cdot x) \cdot W \quad (7)$$

Transmission of ink mold pattern: wireless transmission node is F_{ij} , node transmission function is x_i , multi-channel transmission function of ink mold pattern innovation data is p_i [9], ink mold pattern innovation processing of emblem ink is shown in Equation (8).

$$F_{ij}(x + y) = (x_i - p_i) \quad (8)$$

3. Methodology

3.1 Multi-Channel Wireless Transmission Processing of Ink Mold Pattern Innovation Data

In the ink mold pattern style innovation, a large number of pattern layout schemes are obtained through transmission [10], and then the style transfer algorithm is applied to extract the style of the existing pattern texture, and the pattern structure is compared and integrated, which can realize the rapid innovation and generation of patterns. In addition, the delay of transmission data has an impact on the transmission of traditional cultural data of Huimo, so it is necessary to eliminate irrelevant pattern content and realize the simplified processing of ink mold pattern data [11].

In order to perform the innovative analysis of the ink mold pattern more reasonably, it is necessary to select the nearest channel, and the processing results are shown in Table 1.

Table 1. Selection Rate of Cultural Channels of Huimo Technology

Data Content Ink Mold Type	Source of Information	Engraving Techniques	Pattern Structure	Pattern Content	Innovation Rate
Digital Information	Scanner	70.42	72.23	72.30	80.82
	Video	73.05	73.20	71.51	79.46
	Tape	71.59	73.46	71.72	81.22
	Hard Disk	73.26	70.36	70.39	80.15
	Compact Disc	71.63	72.09	71.71	81.17
Entity Information	Mold	70.89	72.36	72.64	82.27
	Seal	73.06	70.75	71.12	82.24
	Drawing	71.89	71.78	71.48	82.06
	Soil Molds	72.99	70.93	72.19	82.22
	Digital Templates	72.10	72.41	72.26	81.44
Virtual Information	Control Card	73.17	71.92	71.83	81.49
	Computer Cache	70.31	70.38	72.29	83.32
	Network Caching	70.57	74.54	70.69	80.37
	Recording	72.68	72.29	72.31	84.18

From the innovation of ink mold pattern innovation in Table 1, it can be seen that the data transmission integrity of the information source, engraving technique, engraving structure, and emblem ink texture is good, indicating that the operation of each channel terminal is good [12], [13].

3.2 Calculation of Eigenvalue of Ink Mold Pattern Innovation Data

The data in Table 1 is processed for style transfer and the eigenvalues of each migration class are calculated, and the results are shown in Table 2.

Table 2. Calculation of Eigenvalues of Ink Mold Pattern Innovation

Range Source of Information	Pattern Cultural Heritage	Engraving Techniques	Pattern Structure	Emblem Ink Texture
Scanner	0.3459	0.4086	0.4374	0.5650
Video	0.5675	0.4700	0.3574	0.4649

Tape	0.4600	0.3576	0.2096	0.3822
Hard Disk	0.4514	0.4567	0.4254	0.6085
Compact Disc	0.5913	0.3984	0.4475	0.4163
Mold	0.6024	0.3890	0.4072	0.4304
Seal	0.3354	0.5290	0.4266	0.4316
Drawing	0.5299	0.3549	0.4369	0.5364
Soil Molds	0.4585	0.3274	0.5094	0.3786
Digital Templates	0.5525	0.4533	0.4381	0.2706
Control Card	0.3647	0.3577	0.5194	0.4452
Computer Cache	0.2362	0.6259	0.5246	0.4833
Network Caching	0.4289	0.5391	0.6726	0.5091
Recording	0.4732	0.5531	0.3091	0.4885

From the data in Table 2, it can be seen that the innovation matrix innovation value of the style transfer algorithm < 1 , indicates that there are innovation values in the matrix. It also indirectly shows that after the processing of the style transfer algorithm, the innovative value of the ink mold pattern does not change abnormally, or the value is unreasonable, which meets the transmission requirements of multimedia networks. There are great differences in the innovation of ink mold patterns in Huimo, and the wireless data transmission between different styles > 0.036 seconds, indicating that the complexity of ink pattern innovation data and the proportion of natural language are large, and the complexity of transmitting data needs to be simplified. In addition, the innovative data processing capacity of the style transfer algorithm is $> 85\%$, while the transmission volume of ink pattern innovation data is only 21%, which further indicates that the ink pattern innovation data should be simplified.

4. Results and Discussion

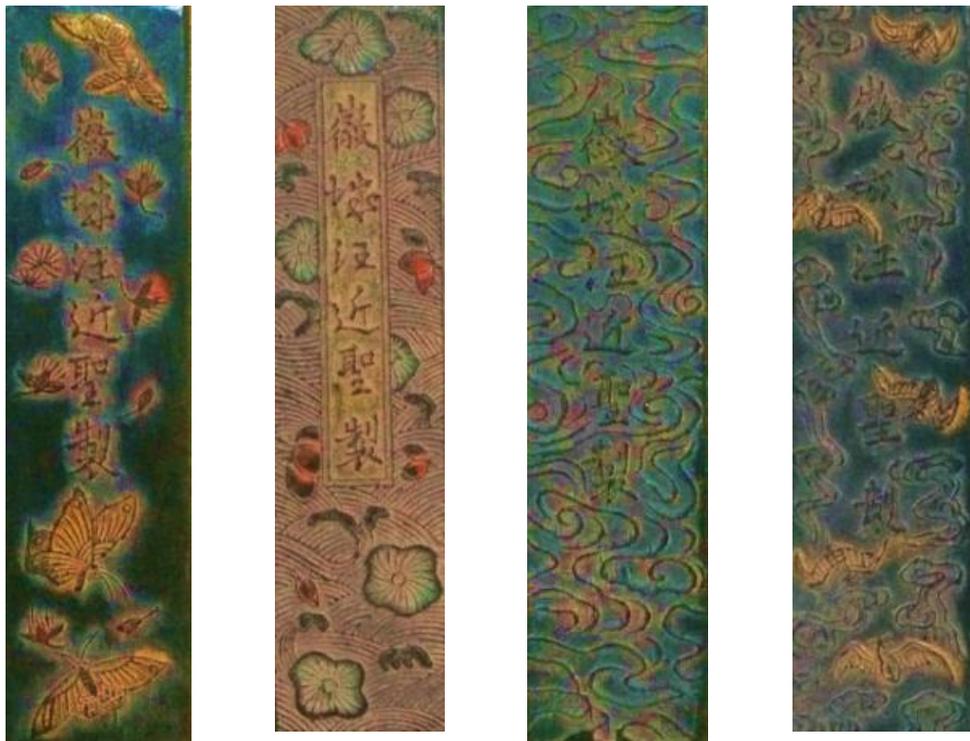
4.1 Conditions for Multimedia Networks

Based on a multimedia network, this paper analyzes the innovation of ink mold patterns based on a software-defined network and analyzes the content, engraving technique, and form [14]-[16]. Among them, there are 12 molds, 4 servers, and 3 multimedia receivers, and the innovative types of ink mold patterns are PDF, CAJ, and other formats. The specific conditions are shown in Table 3.

Table 3. Hardware Conditions of Multimedia Networks

Parameter	Content	Transmission Side
Transfer Rate	1.5ghz	Patterns, Videos
Transfer Format	Text, Pictures, Videos	Natural Language
Transmission Volume	32tg~64tg	Unstructured Data
Single Shot File Format	0.9g	Structured Data

An example of pattern sampling is shown in Figure 1.



Natural pattern

Stripe

Figure 1. Sampling Results of Emblem Ink Patterns

Figure 1 shows the basic and actual display effects of the emblem pattern, and the basic data is used as the framework of the emblem pattern, mainly to show the innovative style of the ink mold pattern, and the emblem pattern style is composed of the cultural content of the emblem ink and the form of ink painting. Results depicted in Figure 1 illustrate the multimedia network's capability in enhancing the stylistic aspects of emblem patterns. It effectively showcases emblem culture and content, indicating a more precise fusion of ink pattern innovation data. This suggests that the pattern innovation analysis facilitated by the multimedia network is highly effective. A detailed summary of the relevant data is presented in Table 4.

Table 4. Style Analysis of Ink Mold Pattern Innovation

Ink Mold Pattern Innovation Content	Research Directions	The Number of Characteristic Indicators	The Specificity of The Feature
Geographical Characteristics	Huangshan	3	81.26
	Xuancheng	2	80.79
Cultural Identity	Calligraphy	16	83.78
	Ink Painting	20	81.41
	Four Treasures Of The Literary Room	12	79.59
Content Characteristics	Traditional Skills	9	79.55
	Historical Origins	36	82.70

The above reasons are mainly due to the fact that Huimo has better graphite and can draw better patterns. The graphite textures in different regions are shown in Figure 2.

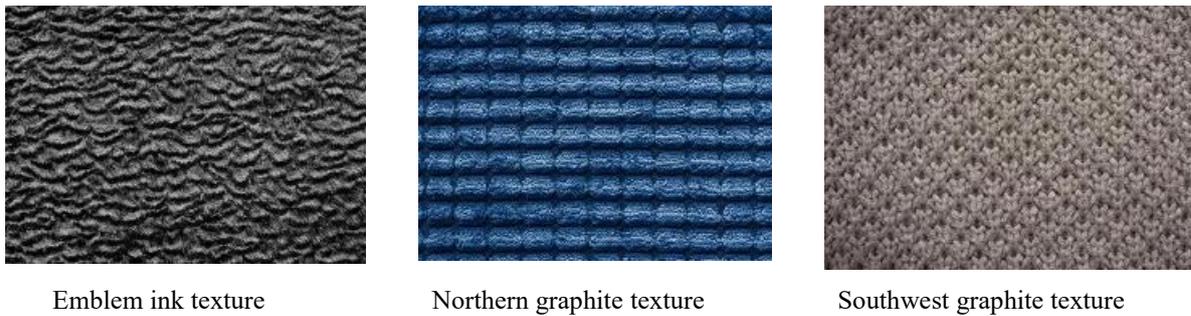


Figure 2. Graphite Texture in Different Regions

As can be seen in Figure 2, the texture of the emblem ink is relatively continuous, making it soft in texture, easy to shape, and able to present a variety of patterns. The grain of northern graphite and southwest graphite is intermittent, and in the process of pattern shaping, there will be certain fragmentation, and there are relatively few innovative patterns.

4.2 The Innovation Process of Emblem Ink Patterns

Ink pattern style analysis is governed by a set of innovation analysis rules. These rules enable a comprehensive examination of the effects of style analysis on ink pattern innovation, as detailed in references [17]-[19]. Additionally, the practical application of these rules is discussed, with specific results of the innovation efforts presented in Table 5.

Table 5. Innovative Style Extraction of Ink Mold Patterns

Innovative Approach	Characteristic Indicators	The Degree of Feature Analysis
Pattern Style Analysis	Structure	67.90
	Color	71.96
	Generality	68.18
	Personality	68.12
	Cultural Connotations	71.24
	Historical Allusions	71.96
	Character Characteristics	70.35
	Text Characteristics	69.03
	Concept Features	67.88
Emblem Features	Shape	64.42
	Size	66.09
	Quality	71.11
	Structure	73.45
The Number of Indexes	13	
Maximum	73.45	
Minimum	64.42	
The Maximum Magnitude of Change	9.03	

The data outlined in Table 5 reveals that the feature degree approaches a tenfold increase. This suggests the multimedia network's proficiency in aligning with real-world features, achieving an amplification exceeding ten times. Additionally, the evolution of ink mold pattern innovation is graphically represented in Figure 3.

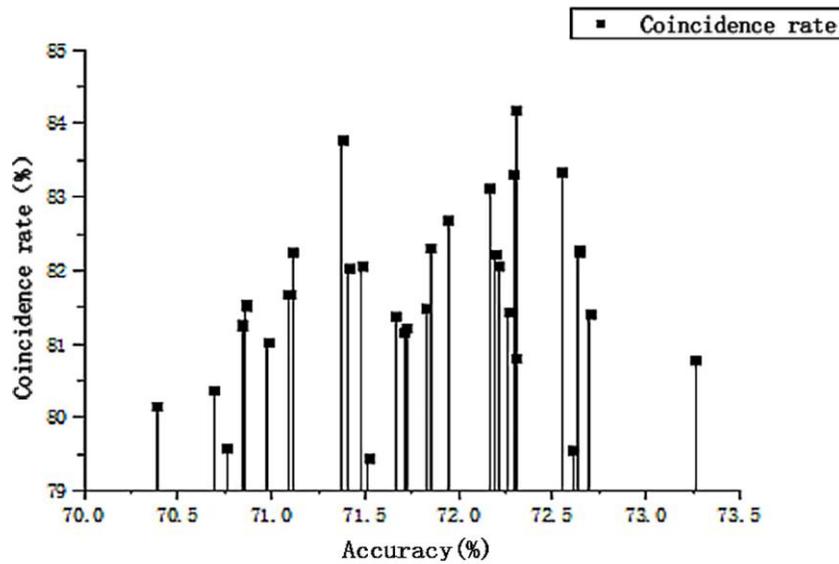


Figure 3. The Innovation Judgment Process of Ink Mold Pattern of Huimo

Figure 3 illustrates that the approach presented in this study significantly innovates emblem patterns. During the innovation of ink mold patterns, the characteristics of the data surpass a 70% threshold and show a trend of continuous increase. The underlying factors contributing to these results include the integration of style transfer algorithms, the selective exclusion of emblem and ink pattern data that doesn't align with cultural styles, the use of a multimedia network to enhance data transmission efficiency, and the reduced server load. Furthermore, the effectiveness of multimedia network technology in the fusion of emblem ink patterns plays a crucial role. The scanning of the emblem ink found that the molecular structure of the emblem ink was arranged relatively regularly and scaly, and there were certain connections between different layers of graphite, resulting in stronger stability of graphite, and the results are shown in Figure 4.

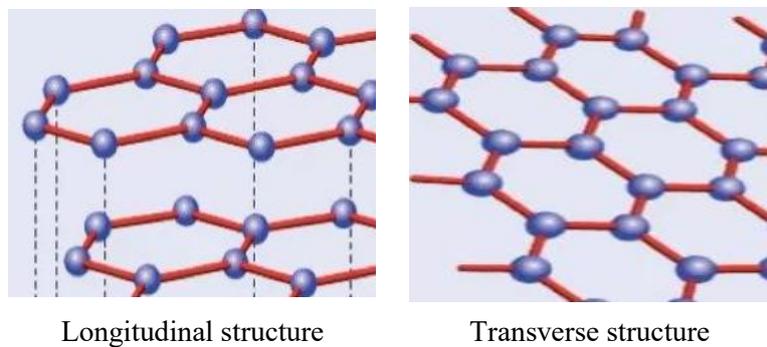


Figure 4. Graphite Structure

It can be seen from Figure 4 that the structure of Huimo graphite is more stable, the horizontal and longitudinal structure distribution is relatively uniform, and there is a strong correlation, which makes the drawing of the Huimo ink mold pattern more stable.

4.3 Style Innovation Rate of Emblem Ink Patterns

Pattern innovation will have an impact on the development of cultural content, data transmission, cultural compatibility [20]-[23], wireless data transmission rate, and cultural occupancy. So to increase the frequency of innovation, the specific results are shown in Table 6.

Table 6. Stylistic Innovation Rate of Emblem Ink Patterns

Style	Content	Pattern	Fusion	Stylistic Features	Transfer Point	Innovation Rate
Natural Style	Character Characteristics	65.33	62.72	69.87	62.81	82.73
	Landscape Features	61.65	61.74	71.39	65.68	80.06

Humanistic Style	Character Characteristics	66.70	65.85	63.19	61.55	85.97
	Landscape Features	64.52	59.59	63.65	65.14	83.24

The variations of style innovation in Table 6 are shown in Figure 5.

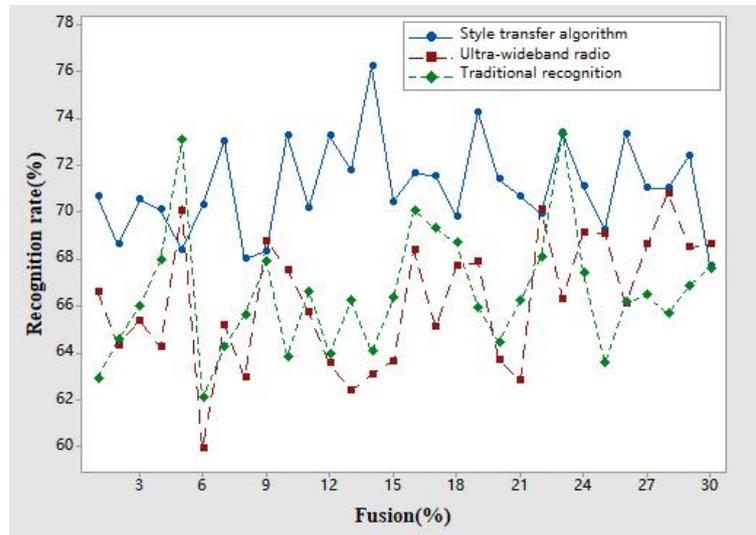


Figure 5. Innovative Style Variation of Ink Mold Pattern Innovation

It can be seen from Figure 5 that under different feature innovation levels, blank images are used as input content patterns for style transfer, without constraints, and the results generated are chaotic. Through the style transfer algorithm, the pattern generated under the constraint has a certain framework, and the output result has better structure differentiation and stronger order. The cultural characteristics of ink mold pattern innovation did not change greatly, indicating that the display content of ink mold pattern innovation had little influence. Moreover, alterations in general characteristics signify a fundamental shift that leaves the emblem ink pattern unaffected. This underscores the capability of the style transfer algorithm to effectively showcase the skills and cultural aspects of emblem ink creation. This efficiency stems from the algorithm's ability to lower the error rate in data transmission, expedite the analysis of ink mold pattern innovation data, increase the volume of data transmitted per instance, and meet the needs for ink pattern innovation analysis by streamlining the data transmission process.

4.4 Multimedia Network Channel Selection Effect

The effectiveness of selection plays a crucial role in the innovative examination of ink mold patterns. It's essential to implement innovative sampling across multiple channel nodes at various style points and to document the real outcomes of these displays. The concrete outcomes of this process are depicted in Figure 6.

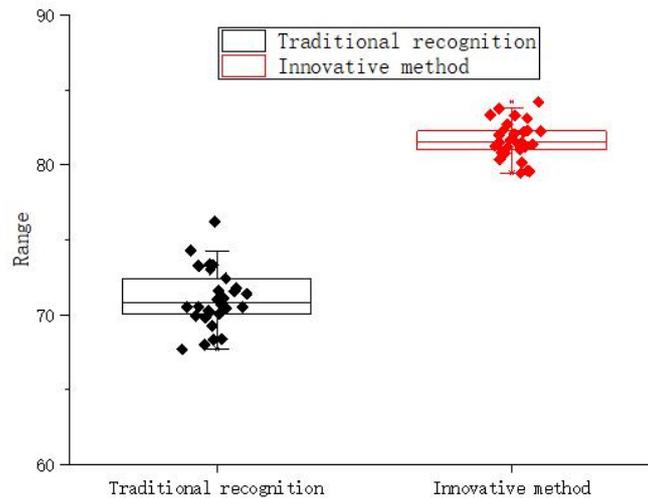


Figure 6. Endpoint Selection Effect of Innovative Analysis of Ink Mold Pattern

An analysis of Figure 6 reveals that relay nodes are distributed in a scattered manner, with the selection effect data gathering from the extremities towards the center. This pattern suggests a significant variance between the relay points and the quantity of features, highlighting the adequacy of relay nodes in fulfilling actual transmission demands. During transmission, the data is predominantly displayed on either side, a phenomenon attributed to the innovation and style of two distinct data sets moving in different directions, leading to iterative changes and enhanced iterative computation within each set. This data underscores the style transfer algorithm's efficiency in innovating the content of the emblem ink pattern and its enhanced capability for multi-channel transmission. By synthesizing the information presented in Figure 6, specific computational results have been deduced, which are detailed in Table 7.

Table 7. Innovative Endpoint Selection Effect of Ink Mold Pattern

Node	Parameter	Node Occupancy	Fusion Effect	Convergence Metrics
Literature Survey	Content Characteristics	66.31	71.78	12
	Color Blending	68.47	70.35	9
	Common Feature Innovation	76.05	72.57	8
Field Trips	Content Characteristics	79.28	73.84	11
	Color Blending	69.23	69.98	13
	Common Feature Innovation	75.29	72.19	6

Based on the results of field investigation and literature investigation, it is found that the test packet recovery rate of content characteristics, color fusion, and common feature innovation is greater than 85% in the entire sampling innovation. The receiving selection effect was 91%, and the progressive probability was greater than 70%, indicating that in different sampling results, the difference between the innovation of ink mold pattern and the actual presentation result was small, and the receiving selection effect and recovery rate were greater than 80%, which further illustrated the multimedia network. It can realize the real-time transmission of ink pattern innovation data, and change the increase and decrease of ink pattern innovation data, and provide wireless transmission data support for the style innovation of ink patterns.

4.5 Effectiveness of Ink Mold Pattern Innovation

The diversity of the emblem pattern, the presentation of cultural details, and the integration of different contents require high-accuracy multimedia network technical parameters as a guarantee to accurately judge the innovation of the ink mold pattern, and the results are shown in Figure 7.

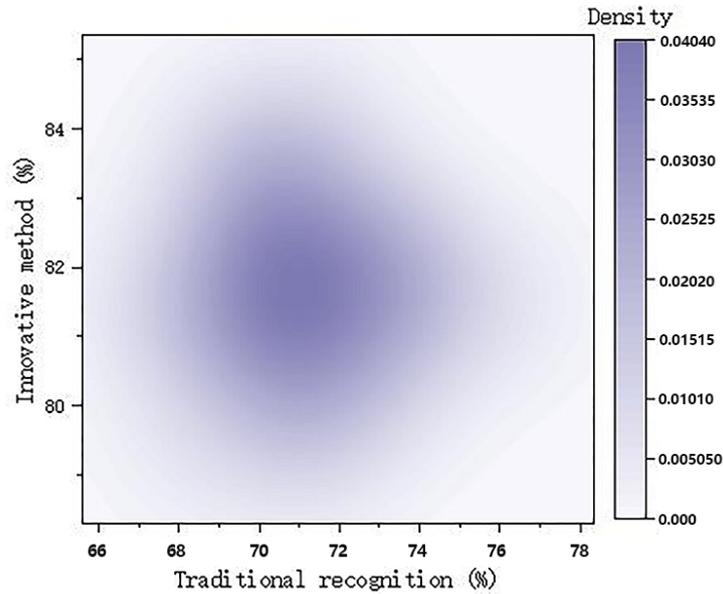


Figure 7. The Transmission Effectiveness of The Style Innovation of the Emblem Ink Pattern

Analysis of Figure 7 indicates that the style transfer algorithm boasts a higher transmission accuracy than conventional innovation approaches. The observed transmission outcomes for various emblem ink patterns closely resemble their actual representations. This suggests that multimedia network technology, in conjunction with multimedia network transmission, is adept at accurately extracting style data. This capability provides robust support for the representation of emblem ink patterns. Detailed outcomes of this analysis are presented in Table 8.

Table 8. Effectiveness of Huimo Pattern Style Innovation

Pattern Innovation Location	The Style Transfer Algorithm Processes the Results		Multimedia Network Transmission Results	
	Pattern	Color	Pattern	Color
Top Half	76.67	75.91	79.23	78.35
Central	74.60	76.40	79.60	81.29
Lower Half	76.21	80.99	78.38	79.37
Top Left	74.81	73.08	79.49	82.86
Top Right	75.61	77.31	79.04	79.09
Bottom Left	72.93	80.26	81.20	80.12
Bottom Right	74.74	72.76	80.15	78.28
Left-Centered	72.25	74.95	79.39	80.36
Right-Centered	74.71	75.23	79.22	81.32

It can be seen from the innovation process of Table 8 that the innovation of ink pattern innovation of Huimo is relatively high, and the transmission rate of multimedia network is greater than 80%, mainly due to the extraction of ink pattern innovation data by style transfer algorithm, which reduces the complexity of data in multimedia network. It is further proved that multimedia network transmission can meet the actual requirements. Moreover, in the process of channel data acquisition point, there is no abnormal interference, indicating that the innovative transmission effect of the ink mold pattern is ideal.

5. Conclusion

In this paper, an innovative method of ink mold pattern with a style transfer algorithm is proposed for the ink pattern of emblem ink, which uses multimedia network technology and multimedia network technology to achieve a transmission rate of 10 Gpits. The test results show that the transmission effectiveness of multimedia network technology is greater than 90%, and the style transfer algorithm combined with multimedia network technology can reasonably select the relay point, and the transmission compliance rate reaches 80%. The above can meet the needs of ink mold pattern innovation. Therefore, the style transfer algorithm, multimedia network technology, and multimedia network technology can realize the innovation of ink mold patterns and promote the development of emblem ink creation techniques.

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