

Extraction and Reuse of Visual Elements of Children's Hat Creative Products Based on Gannan Hakka Culture

Lin Guo

Gannan Normal University, Jiangxi, China

Abstract: Now society has entered a new era. With the rapid development of economy, people's pursuit of a better life is becoming more and more intense. Tourism has increasingly become the leading role in people's lives, the subject of a better life, and the symbol of a national culture. Absorbing the essence of traditional culture in the design process of modern cultural and creative products can enhance the confidence of national culture. Gannan is the birthplace of Hakka people with a long history and rich Hakka culture, including historical culture, folk culture, catering culture, architectural relics, language culture, etc. This paper studies the extraction and reapplication of visual elements of children's hats based on Gannan Hakka culture, involving image processing. Wavelet transform has the ability to characterize the local characteristics of signals in time domain and frequency domain. Wavelet analysis based on wavelet transform can focus on any details of the signal in the time-frequency domain by using a scalable and translatable variable window. It can not only see the full picture of the signal, but also analyze the details of the signal, and retain the instantaneous characteristics of the data. Through research, the research effect of this paper is remarkable and suitable for wide application.

Keywords: Gannan Hakka culture; Cultural and creative products; Visual Elements.

1. Introduction

With the change of the times, the design field has put forward the concept of "Yue nationality, Yue world". As the cradle of Hakka culture, Gannan itself carries the label of cultural image, and its cultural connotation is rich and diverse. It is particularly important and far-reaching to explore and develop the unique regional culture of Gannan culture [1]. As the birthplace of Chinese civilization, the Central Plains region has long maintained its central position in history and culture, while the Central Plains culture is better preserved by the Hakka culture, because it is located in the remote mountain areas in the south, is less affected by war, and relatively completely preserves the original appearance of the Central Plains culture at that time. Therefore, the Hakka culture is also one of the migration histories of human history [2]. On the one hand, it is to pass on the history and culture, so that the history and culture will not disappear and can continue. On the other hand, based on the cultural heritage, we can not only pay effective attention to the regional culture, but also spread it farther and have a wider impact, and give more soul to the connotation of advertising design [3]. Gannan Hakka culture has a long history, among which the Hakka residential architecture culture is rich and colorful, more distinctive. As a carrier, Hakka residential buildings reflect the life and production mode of Hakka people and highlight the unique cultural attributes of Hakka [4]. Hakka culture, while absorbing foreign cultural consciousness, also self-examines its own cultural consciousness, retains valuable things in national tradition, and also accepts the essence of foreign culture. Due to the complex terrain in the south of Jiangxi, the enclosed houses in the south of Jiangxi have unique regional characteristics in the south of Jiangxi. This excellent culture that condenses regional characteristics has a profound impact on artistic design creation [5].

2. Gannan Hakka Culture and Its Visual Aesthetic Characteristics

2.1. Gannan Hakka Culture

Hakka culture is a multi-cultural culture formed by taking the traditional culture of Han nationality as the main body and integrating the culture of She, Yao and other indigenous peoples; She has a simple and unadorned style and pragmatic and evasive spirit [6]. Hakka has a long history, which breeds the Hakka spirit of hard-working and hardworking, and creates a rich and colorful Hakka culture [7]. Among them, Ganzhou, an old city with a history of 1000 years, is known as the "Hakka Cradle" because Hakka ancestors first set foot here and nurtured the growth of Hakka culture [8]. Compared with western Fujian and eastern Guangdong, Gannan Hakka culture has attracted worldwide attention for its long history and rich content; It includes historical and cultural relics, surname and clan culture, dialect culture, folk house culture, catering culture, clothing culture, folk culture, folk literature and art, etc. However, due to the lack of development of Hakka culture with local characteristics in the later period, the local characteristics were not paid attention to, which led to the weak competitiveness of Hakka culture in southern Jiangxi compared with western Fujian and eastern Guangdong, and gradually faded out of people's sight. If its development is allowed, it will lead to a serious consequence of the lack of historical and cultural inheritance, which is very unfavorable for future generations to study and trace the history of Hakka in southern Jiangxi [9]. Gannan landscape is shown in Figure 1.

Gannan covers about a quarter of Jiangxi's land area, and nearly 40000 square kilometers of fertile land contains rich Hakka culture, including Gannan's dramas, folk songs and quyi, Gannan Tea Picking Opera, Ningdu Tea Picking Opera, Donghe Opera, Ganzhou North South Ci, Xingguo North South Ci, Yudu Daoqing, etc. Among them, Gannan Tea Picking Opera has the greatest influence [10]. As one of the

eight ethnic groups of the Han nationality, the Hakka ethnic group has a profound influence because of its unique customs, significance and extensive population distribution. The reason why Hakka people are called Hakkas is that the formation of this ethnic group is a new special ethnic group formed by the large-scale southward migration of Han people in Central Plains caused by five wars.



Figure 1. Landscape of South Jiangxi

For more than a thousand years, Hakka ancestors have come here through thousands of hardships. They have grown stronger and stronger through mutual adaptation with the local people. Paper cutting and paper binding art were widely popular in various folk festivities and entertainment activities in ancient Gannan, playing a moral and decorative role; Carving art, mainly wood carving and stone carving in southern Jiangxi; Embroidery has a long history in Gannan Hakka area; In ancient times, Gannan was rich in porcelain, reaching its peak in the Tang and Song Dynasties; Gannan has been a Hakka area with relatively developed culture since ancient times. Hakka people are mainly distributed in Jingnan, western Fujian and eastern Guangdong. They are a special group that has an inseparable relationship with the Han people and also exists independently. They have their own language, folk customs, architecture, clothing and catering culture. Its common Hakka culture is the material culture and spiritual culture jointly created by countless Hakka people for thousands of years. It not only inherits the original Han culture, but also integrates the local culture in the south, with rich cultural connotation.

2.2. The Charm and Visual Aesthetic Characteristics of Gannan Hakka Culture

Gannan Hakka culture has a long history and rich content. They are embodied in architecture, food, clothing, folk customs, literature and art, etc. Make full use of the multi-dimensional communication of new media, combine traditional culture with modern art design, so that the regional brand image design is full of individuality and interactivity. Through refining the local related elements, the functional and identifying integration of the unique image of the Tai Po region is carried out, conveying the brand's positioning and regional attributes. The origin of Ganzhou and Hakka culture should start from the formation of the whole Hakka ethnic system. As is known to all, Hakka is a special ethnic group formed from the Wei, Jin, Southern and Northern Dynasties. Because of the war, the people in the Central Plains moved southward for five times. As the only ethnic group not named by region, the reason is that the formation of the Hakka ethnic group is a long-term, fragmented and complex process.

Due to the complexity of Hakka's regional environment, if we want to establish a brand image with regional culture, deeply explore its cultural connotation, and highlight its culture with national and regional characteristics, such as the legend of good luck, the book of mountains and seas, Ya'an culture, and so on. When it is necessary to design projects that

are interactive, personalized and emotional, the positioning of brand design should be consistent with the local geographical environment. First of all, designers should understand the local culture, which can help designers find more design inspiration and design elements. Develop products with historical and cultural flavor and regional elements. For example, the cultural and creative products of the recently burning Forbidden City are characterized by taking the collection of the Forbidden City as an element, which contains a lot of historical and cultural details and develops a series of cultural and creative products. Looking at the design status quo of domestic and foreign brand images in recent years, there is a trend of diversified development, with more attention to humanity and emotion in the content and more consideration of the openness of extended applications in the form of expression. For example, in the design of the ticket station, the shape features of the cool hat and Hakka's hat are fully extracted for design, forming a distinctive regional design.

Gannan Hakka culture has its unique cultural charm. In the process of development and construction of Gannan, the hardworking Hakka ancestors in Gannan left a large number of cultural relics with research value, as well as brilliant intangible cultural heritage. Hakka has a high degree of civilization, which permeates daily life. With the continuous improvement of people's aesthetics and the change of society's demand for design, if we want to maximize the effectiveness of the conveyed brand, we should not stick to tradition, nor blindly pursue the innovation of new trends and fashion, but should find a balance between fashion and tradition.

3. Methods and results

3.1. Image Processing Based on Wavelet Transform

This paper discusses the extraction and reapplication of visual elements, so it involves image processing. Here is an introduction to image processing. As a vivid imitation or description of the similarity of objective objects, images can not only reflect the objective existence of objects, but also reflect human psychological factors. The purpose of image processing is to process and analyze image information to meet people's visual and psychological needs and requirements of a certain purpose. 70% of the information that human beings receive from the outside world comes from the visual system. Therefore, in the process of transmitting information, image is a very important medium. The interdisciplinary and cross industry characteristics of image processing play a role of mutual assistance and reference with many disciplines such as mathematics and computer science, and its development and application are inextricably linked with these disciplines, so image processing has become a very active frontier discipline. The overall framework of image processing is shown in Figure 2.

Digital image is an image format that is discrete in both space and amplitude. Digital images are easier to save and post process. Therefore, digital images are slowly applied to the image field, and digital image processing is becoming more and more possible. The research of image processing methods mainly comes from two application fields: first, it is to facilitate people's further analysis of images; Secondly, research and process the image data in the process of storage, transmission and display to enable the machine to better

understand the image data automatically.

Let $\psi(x) \in L^2(R)$, its Fourier transform is $\hat{\psi}(w)$, when $\hat{\psi}(w)$ satisfies the allowable condition (complete reconstruction condition or identity resolution condition), we call $\psi(x)$ a basic wavelet. That is, formula (1):

$$C_\psi = \int_R \frac{|\hat{\psi}(w)|^2}{|w|} dw < \infty \quad (1)$$

After stretching and balancing the $\psi(x)$, we get:

$$\psi_{a,b}(x) = \frac{1}{\sqrt{|a|}} \psi\left(\frac{x-b}{a}\right) \quad a, b \in R \& a \neq 0 \quad (2)$$

$\psi_{a,b}(x)$ is a wavelet sequence, of which a is the scaling factor and b is the balance factor. The continuous wavelet

transforms for an arbitrary function $f(x) \in L^2(R)$ is:

$$W_f(a, b) = \langle f, \psi_{a,b} \rangle = |a|^{\frac{1}{2}} \int_R f(x) \psi\left(\frac{x-b}{a}\right) dx \quad (3)$$

Which inverts to:

$$f(x) = \frac{1}{c_\psi} \int_{-\infty}^{\infty} \int_{-\infty}^{\infty} \frac{1}{a^2} W_f(a, b) \psi\left(\frac{x-b}{a}\right) da db \quad (4)$$

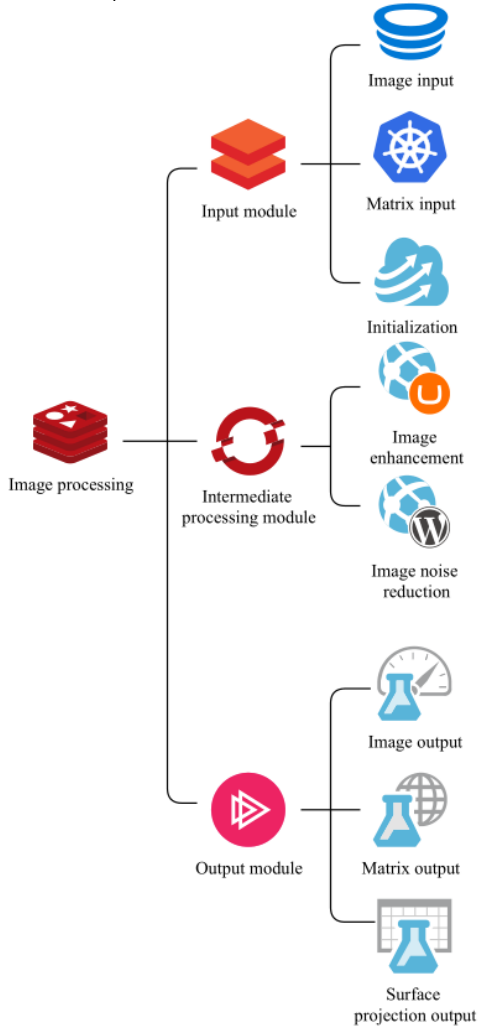


Figure 2. General framework of image processing

Before the advent of wavelet transform, Fourier transform occupied an absolute dominant position in the field of signal processing. Fourier transform is a signal processing method that converts time-domain signals into frequency-domain signals. With the progress of science and technology, image processing technology has been greatly developed since the 1960s. Now image processing technology is not only used in high-tech fields such as medicine and space projects, but also has been more widely used in industry, biological science and

other more interdisciplinary fields. Fourier transform also has its own limitations: it cannot describe the time and frequency characteristics of the signal at the same time. It can't tell exactly when a certain frequency occurs. Therefore, it is difficult for Fourier transform to process non-stationary transform signal. While wavelet transform has the ability to characterize the local characteristics of signals in both time-frequency domains, wavelet analysis based on wavelet transform can focus on any details of the signal for time-frequency domain processing using a scalable and translatable variable window, which can not only see the full picture of the signal, but also analyze the details of the signal, and retain the instantaneous characteristics of the data. In the field of image processing, as a new signal processing technology, wavelet transform has the characteristics of time-frequency localization and multi-resolution, so it has been widely used. In the past few years, the great influence of wavelet not only lies in its theoretical consistency, but also in its practical application.

3.2. Hakka culture is integrated into brand cultural and creative design

To be exact, brand design is often not limited to simply designing a logo, or using the logo in office supplies. Make full use of the multi-dimensional communication of new media, combine traditional culture with modern art design, and make the regional brand image design full of individuality and interactivity. The power of branding is to let people understand and know a certain area, and naturally connect a certain image and association with the existence of the city. Shaping Hakka culture into a tourism brand is of great significance to show Hakka people's unique democratic spirit and common psychological quality with national characteristics.

The perfect combination of the design style of modern children's hats and the traditional physical visual elements can not only enable the development and dissemination of the traditional children's hats' visual elements, but also give the modern children's hats' artistic design a deeper cultural connotation. With the continuous development of dynamic technology, the symbols of traditional physical visual elements can be combined through these new technological media to let the public feel the charm and cultural heritage of the tradition, so that the traditional physical visual elements can develop and grow rapidly on the basis of breaking away from the inherent. As a cultural and creative product of cross culture and tourism, the design and development of children's hats must have cultural connotation and cultural elements, play a good role in carrying and disseminating the essence of Gannan Hakka culture, and be innovative and creative, which can stimulate consumers' curiosity. As a way of expressing visual information, visual communication design has become an important component of creative industries. How to do it, what to do, and how to tell after doing it are all problems that need to be solved in the design process. According to Table 1 and Table 2, Figure 3 and Figure 4, the method in this paper is 17.35% better than the current method, which is suitable for extensive use.

Table 1. Effect of Serial Termination Resistance on Signal Quality

	0	1000	2000	3000	4000	5000
Predictive value	-0.7	1.3	0.5	3.4	1.6	-0.8
Actual value	2.4	2.2	0.3	0	-1	2.3

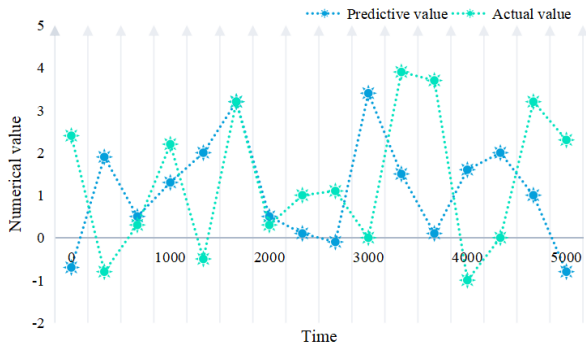


Figure 3. Effect of Serial Termination Resistance on Signal Quality

Table 2. Relative error curve of restored image

	0	2	4	6	8	10
Predictive value	0.1	0.06	0.07	0.11	0.16	0.24
Actual value	0.09	0.07	0.04	0.09	0.18	0.22

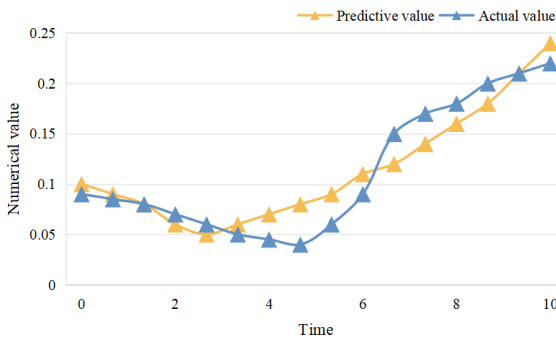


Figure 4. Relative error curve of restored image

The extraction of Hakka cultural elements should not be too abstract, but should retain its original and intuitive characteristics, so that tourism consumers can fully perceive the cultural charm and spiritual enjoyment of Hakka culture. Each traditional element is integrated into a new way of expression and kneaded to create a new era of visual language. Hakka traditional culture contains rich visual symbol resources that can be used as visual communication design elements, including physical and nonphysical elements. These elements can be used in font design, graphic creative design, animation design, advertising design and packaging design, the design works have both a sense of vision of modern trend elements and a strong Hakka cultural connotation. Cultural and creative products belong to the discipline of product design. The cultural and creative design of Hakka cultural tourism brand should not be too rigid, but should start from the perspective of modern aesthetics, find the point of convergence with the cultural and creative products of tourism brand through the refinement of Hakka cultural connotation, and realize the visual transformation of cultural connotation. The corresponding Hakka physical state visual elements are extracted. Physical visual elements are usually tangible, with fixed morphological characteristics, usually presented in a plane or three-dimensional form, and hidden behind its form are non-material forms with spiritual connotation and significance.

4. Conclusions

In the process of promoting the innovative development of

excellent traditional culture in the new era, it is of great practical significance to study the architectural cultural factors with regional cultural characteristics for the inheritance and development of traditional culture. By shaping the visual image of the city, the connotation, folk customs and culture of the city can be displayed in an intuitive way, so as to promote the development of the region and establish the cultural image of the city, which can give full play to the functions of the city and has strong practical significance. On the basis of cultural self-confidence, regional culture has become the source of visual design. The research on the development and application of Gannan Hakka culture not only provides a strong guarantee for us to inherit and develop national culture, but also provides a material and spiritual basis for enriching people's lives and cultivating their sentiments. The culture of a region is the most important intangible asset of the region, which reflects the value of the city through the cultural transmission of city symbols. We know that Gannan Hakka cultural products are rich and colorful, and the development and packaging of Hakka cultural products have a broad market. A successful cultural and creative product cannot be separated from the extraction and application of visual elements, and each element in visual design is inseparable and occupies an important position in the entire visual display. The combination of visual elements and traditional Gannan culture has further attracted consumers' attention, guided their purchase behavior, and promoted the sales of goods. Therefore, this study is of great significance in the marketing of cultural and creative products.

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References

- [1] Onochie-Quintanilla E, Defior S, Simpson I C. Visual multi-element processing as a pre-reading predictor of decoding skill. *Journal of Memory and Language*, vol. 94, no. 1, pp. 134-148, 2017.
- [2] Vela J D S E, Nogue J, Govers R. Visual landscape as a key element of place branding. *Journal of Place Management & Development*, vol. 10, no. 1, pp. 23-44, 2017.
- [3] Emma B, Lowery A J, Ramesh R. A comparison of microelectrodes for a visual cortical prosthesis using finite element analysis. *Frontiers in neuroengineering*, vol. 2012, no. 5, pp. 23, 2020.
- [4] Meyerhoff H S, Gehrer N A, Proulx M J. Visuo-perceptual capabilities predict sensitivity for coinciding auditory and visual transients in multi-element displays. *Plos One*, vol. 12, no. 9, pp. e0183723, 2017.
- [5] Wei H, Liu X, Li L. Visual indentation apparatus and finite element modelling as a method to characterize 3D mechanical properties of facial skin in vivo. *Mechanics of Materials*, vol. 157, no. 1, pp. 103852, 2021.
- [6] Li X, Larson M, Hanjalic A. Geo-distinctive Visual Element Matching for Location Estimation of Images. *IEEE Transactions on Multimedia*, vol. 20, no. 5, pp. 1179-1194, 2018.
- [7] Vojkovic J. Film Costume as a Visual Narrative Element; Defining the Abstract Emotions of the Film Viewer via Plutchik's Wheel of Emotions. *Textile & Leather Review*, vol. 3, no. 2, pp. 92-100, 2020.

- [8] Kb A, Jj A, Pb A. Attracting User Attention to Visual Elements within Website with the use of Fitts's Law and Flickering Effect. *Procedia Computer Science*, vol. 176, no. 3, pp. 2756-2763, 2020.
- [9] Xiao H, Shi J. Video Captioning Based on C3D and Visual Elements. *Huanan Ligong Daxue Xuebao/Journal of South China University of Technology (Natural Science)*, vol. 46, no. 8, pp. 88-95, 2018.
- [10] Leonov P, Kozhina A, Leonova E. Visual analysis in identifying a typical indicators of financial statements as an element of artificial intelligence technology in audit - ScienceDirect. *Procedia Computer Science*, vol. 169, no. 2, pp. 710-714, 2020.