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Research Article

Application of Isomorphic Block Decoration Based on VR and Internet of Things in Fashion Design

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With the development of VR and Internet of things and the characteristics of isomorphic block decoration, based on the two technologies, this paper comes to the realization of isomorphic block decoration in fashion design. Firstly, by analyzing the algorithm combining VR and the Internet of things, a platform based on the combination of both technologies is established. Then, the platform is applied to the same shape block decoration in different cities in the process of fashion design, and the differences in the process of fashion design are analyzed. The results of fashion design show that the isomorphic block decoration based on the combination of VR and Internet of things should be designed according to the local characteristics to promote the development of fashion design industry according to local conditions. In general, this paper provides some theoretical and practical experience for the application of isomorphic block decoration in fashion design.

1. Introduction

With the birth and rise of a new round of scientific and technological revolution and industrial reform, emerging industries represented by the Internet of things, VR, and big data have developed rapidly. The state and society pay great attention to them. The technological achievements of China's intelligent manufacturing industry are prominent [1]. Big data, the Internet of things, and VR are booming and begin to be widely used in social production and life, with infinite market potential.

As an important part of the new generation of information technology, the Internet of things technology, network intelligence is its biggest feature. The Internet of things technology uses local network or Internet technology to organically integrate personnel, equipment, and goods to form an intelligent network with interconnected subjects and remote control [2]. A variety of intelligent applications of the Internet of things system will become an important feature of the next generation of Internet. In the future, the renewal of the Internet of things will spread all over every corner of life, so that the automation management level of various industries can be improved, human intervention can be effectively controlled, and work efficiency and system stability can be greatly improved [3]. At present, the global Internet of things industry is still in the initial stage of development, and the Internet of things has been well applied in machine communication, power grid, and Internet of vehicles.

China's Internet of things has initially formed a relatively perfect industrial system, including chips and components, software, telecom operation, fashion design, and Internet of things services. The Internet of things continues to integrate and penetrate with traditional industries and other information technologies. For example, the Internet of things has been better applied in fashion design. Through the wireless communication technology of the Internet of things, the on-site monitoring of fashion design can be realized, the problems existing in fashion production can be detected in real time, and remote automatic control can be carried out [4, 5].

The Internet of things focuses on improving the industrial environment of manufacturing, logistics, energy, and aviation industries on a large scale. It uses a series of

tools and technologies from small environmental sensors to supply chain monitoring and advanced analysis to make better business decisions and gain competitive advantage [6]. With the comprehensive and in-depth development of the Internet of things, the Internet of things shows a beautiful blueprint for the future through the following four characteristics [7, 8]. First is the intelligent perception. The Internet of things uses RFID, sensors, and other technologies to obtain information and data of products at all stages from production process to sales to end users at any time. Second is the interconnected transmission. The Internet of things connects the private network and the Internet to transmit the equipment information accurately in real time. It has a strong dependence on the network and pays more attention to data interaction. Third is the intelligent processing. The Internet of things uses intelligent computing technologies such as cloud computing, cloud storage, fuzzy recognition, and neural network to analyze and process data and information and dig deep into the value of data in combination with big data. Fourth is the self-optimization. The Internet of things forms an effective inheritable knowledge base, model base, and resource base by processing, analyzing, and storing industrial resource data [9]. After continuous iterative self-optimization, it realizes all-round connectivity to achieve the optimal goal.

The Internet of things can use a range of tools and technologies, from small environmental sensors to supply chain monitoring and advanced analysis, to make better business decisions and gain competitive advantage [10, 11]. First is to improve inventory management, cloud-based inventory system, and the Internet of things benefits the inventory planning process in various ways. The second is to obtain the visibility of the supply chain. Internet of things technology enables users to obtain real-time information by tracking materials, manufacturing cycles, and the movement of individual products in the global supply chain. These data can help manufacturers predict potential problems and make procurement decisions based on various factors. Third, improve product design and quality control. The dedicated sensors of the Internet of things can be used to collect product data and third-party data associated with each stage of the product cycle to help determine the impact of external factors on the final product [12]. In general, the advanced technology of the Internet of things can be used to predict and analyze products, so as to promote the optimal production of products and the progress and development of social economy.

VR, that is, virtual reality, was proposed by American VPL company in the 1980s. It refers to the technology of comprehensively utilizing computer graphics system and various reality and control interface devices to provide immersion feeling in the interactive three-dimensional environment generated on the computer. At present, there is no international standard to generate virtual reality through virtual computer technology; its basic meaning is "create a virtual environment integrating vision, hearing and touch through computer technology to provide users with a more real feeling of use [13]." This technology entered China in early 2016 and gradually formed an industrial chain. VR technology is penetrating into all walks of life. VR technology integrates artificial intelligence, sensing technology, and software and hardware technology [14]. It can clearly show three-dimensional real-time graphics and has a far-reaching impact on human life and work influence. VR technology places people in the three-dimensional sensory world through special equipment such as data gloves, including vision, hearing, and touch, making users feel immersive. VR technology can transform design patterns into dynamic ones in digital media art design and enhance the relationship with the audience. At present, China's VR market is still in the stage of germination and exploration. At present, the hardware level of VR is low, there are few VR contents, and the comfort and experience are low. Technical problems restrict the content presentation and user experience, which cannot meet the conceptual requirements conveyed by VR. It is also necessary to improve the performance of VR hardware through more technical research and development and product iteration. However, with the continuous improvement of the quality of VR products, as well as the continuous popularization of VR concept to consumers through VR advertising and network communication, providing more experience opportunities, VR technology will be more applied to products to meet the needs of most people [15].

The rapid development of VR technology is inseparable from the progress of science and technology, but its characteristics are the main factor to promote its rapid development. At present, VR technology mainly has the following characteristics: first is the characteristic of telepresence [16]. VR refers to the process of user immersive technology, which is also called VR immersive technology. In the virtual world simulated by VR technology, the audience cannot distinguish the true and false of the environment. The virtual simulation environment will make the audience devote themselves to the simulated scene. In the computer three-dimensional virtual environment, as in the real environment, the audience can see, touch, and hear the content very real. Second is the interactive characteristic. Interactivity refers to the realization of the spatial induction between the experiencer and the virtual world through human-computer interaction, and the in-depth cognitive experience and emotional experience through the sharing of visual space. Third is autonomy. The characteristic of autonomy, also known as the characteristic of conception, means that no matter how is the virtual environment, the experimenter can analyze the environment by themselves, solve the problems existing in the virtual environment with their own cognitive and perceptual ability, obtain information in an all-round way, and give full play to the user's subjective initiative in the virtual world.

In recent years, with the development of VR and Internet of things technology, the combination of VR and IOT to realize the fashion design of isomorphic block decoration has become the mainstream, which is deeply loved and welcomed by everyone [17]. Because the combination of VR and Internet of things technology can well help brands improve their popularity, reputation, and loyalty, those

clothing brands that need to show foresight and sensitivity to the trend or take technology as the selling point can benefit from the marketing of the Internet of things platform. Social hot spots such as new technology are one of the topics in the fashion circle chasing the trend. VR and Internet of things technology can be used as long as there are appropriate occasions. For example, if e-commerce brands want to reach offline, they can use VR and Internet of things technology for brand promotion in offline activities to increase brand exposure and attract potential customers.

At present, physical clothing stores are at a critical juncture of recovery, and various clothing brands are racking their brains to develop offline retail stores. Flash stores, life experience space, and online and offline synchronous marketing with experience, scene, social communication, and the Internet of things as the core are favored by clothing brands. In the retail model based on experience marketing, VR can play a promoting role. One is to add additional entertainment attributes in the shopping process, complete the shopping scene, please consumers, and improve the conversion rate. The other is the VR experience directly related to the product, including the feeling of fashion show display and commodity upper body [18]. In general, from the perspective of the whole offline consumption process, clothing marketing based on the combination of VR and Internet of things can attract consumers' attention and gather popularity; provide in-depth interaction between customers and brands, in-store environment, and products; and improve customer participation and promote shopping decision-making.

However, for fashion design, isomorphic block decoration is the core design point of clothing. In fashion design, isomorphic block decoration can reflect the artistic beauty of clothing, increase its attraction, and better promote the development of clothing. Isomorphic block decoration refers to the decorative structure composed of modular units of the same shape. It is also a decorative technique used in modular clothing. In fashion design, the combination of different pieces of clothing is described by words such as "patchwork," "splicing," or "collage," so "block" is used instead of "module" to emphasize the process of garment splicing. With many parts, complex structure, and strong decorative effect, the isomorphic block decorative sheet is mostly used in handmade clothes.

At present, the isomorphic block decoration based on the combination of VR and Internet of things has been greatly studied in fashion design. Ding et al. [19] based on VR and Internet of things technology researched and developed the microstructure of clothing materials, customized specific isomorphic block decoration, and greatly attracted the attention of consumers. Based on the special "immersion" and "interaction" attributes of VR technology, Lee et al. [20] refitted the isomorphic block decoration, so as to achieve the innovation of garment design and achieve the purpose of garment brand marketing. Zheng [21] effectively combined VR with the Internet of things. Through online publicity, consumers could give feedback on their favorite isomorphic block decoration in real time, and then customized appropriate clothes, which greatly promoted the development of the garment industry. Wang et al. [22] broke through the traditional garment making mode and garment style; omitted the steps of needle and thread suture in the design; used unconventional materials such as metal, plastic paper, and rubber; took circle or square as block units; and made avant-garde clothes through metal ring connection. Then, with the help of VR and Internet of things technology, it had greatly promoted the marketing of clothing.

In general, the combination of VR and Internet of things is conducive to the application of isomorphic block decoration in fashion design. Therefore, this paper establishes a platform for the combination of VR and Internet of things and studies the construction and function establishment process of this platform in detail. Then, based on the platform of the combination of VR and Internet of things, this paper compares and analyzes the implementation process of isomorphic block decoration in clothing design in different cities, so as to provide some theoretical and experimental support for clothing design and point out the development direction of the application of captain isomorphic block decoration in clothing to a certain extent.

2. Establishment Process of Platform Based on VR and Internet of Things

2.1. Algorithm Analysis Based on the Combination of VR and Internet of Things. After introducing the technology of VR + Internet into the decoration design of the same shape block, to ensure the superiority of the same shape block decoration in the costume design in the fierce market competition, we need to consider the advanced nature of the same shape block and the information response speed of the Internet of things and control the problems that may arise in the process of garment design. Therefore, this paper regards the characteristics of isomorphic block decoration as a perspective. When constructing the implementation model of isomorphic block decoration in fashion design, we need to consider how to reduce these perspectives with low contribution. Therefore, this paper proposes a multiview classification model for the realization of isomorphic block decoration in fashion design, which can reduce the viewing angle.

Suppose that the training data set composed of N decoration process text vectors is expressed as $\mathbf{D} = \{x_i^1, x_i^2, \ldots, x_i^M\}_{i=1}^N$. M represents the dimension of each text vector, that is, the number of perspectives. x_i^m represents the eigenvalue of the mth ($m = 1,2, ..., M$) angle of view of the ith ($i = 1,2, ..., N$) text vector in $\mathbf{D}$. For multiperspective collaborative learning, the desired ideal state is that the classification results on each perspective are as consistent as possible. When learning from multiple perspectives, we should give full play to the technical advantages of VR and the Internet of things to make the classification of the same type uniform, so as to ensure the consistency of classification results. Therefore, the cooperative learning criterion of VR and IOT combined algorithm on the training data set $\boldsymbol{D}$ can be expressed in the form shown in the equations:

$$\mathbf{O} = \frac{\alpha}{2} \sum_{m=1}^{M} \sum_{c=1}^{C} \sum_{i=1}^{N} \left[f\left(x_{gi}^{m}\right) - \frac{1}{M-1} \sum_{l=1, l \neq m}^{M} f\left(x_{gi}^{l}\right) \right]. \tag{1}$$

$$\begin{aligned} f\left(x_{gi}^{m}\right) &= \left(\mathbf{p}_{g,c}^{m}\right)^{\mathbf{T}} x_{gi}^{m}, \\ f\left(x_{gi}^{l}\right) &= \left(\mathbf{p}_{g,c}^{l}\right)^{\mathbf{T}} x_{gi}^{l}, \end{aligned} \tag{2}$$

where C represents the number of categories and reflects the eigenvalues of data sets from different perspectives and the accuracy of the combination of VR and the Internet of things.x_{gi}^{m} represents the input after x_i^m passes the mapping. $\mathbf{P}_{g,c}^{m}$ represents the subsequent parameters of class c ($C = 1,2, ..., C$) from the mth perspective. $\mathbf{P}_{g,c}^{l}$ represents the a priori and a posteriori parameters of class c from the perspective of l ($l = 1,2, ..., M$). $1/M - 1 \sum_{l=1,l\neq m}^{M} f\left(x_{gi}^{l}\right)$ represents the mean value of classification results from each perspective. $f(x_{gi}^{m})$ represents the expected classification result of the mth perspective. Parameter α is used to control the consistency degree between $f(x_{gi}^{m})$ and $1/M - 1 \sum_{l=1,l\neq m}^{M} f\left(x_{gi}^{l}\right)$, which is specified by the user. In my opinion, α is determined by the degree of economic development among cities. In this paper, α is 1.5 for Beijing, 1.42 for Shanghai, and 1.25 for Tianjin. The classification results of each perspective can be consistent through minimization (1) to realize collaborative learning among multiple perspectives.

2.2. Perspective Reduction Mechanism. In training data set $\boldsymbol{D}$, there may be some perspectives (features) that have a negative impact on the final classification results. Therefore, a mechanism is needed to realize the automatic reduction of such perspectives and reduce or shield the negative impact of such perspectives. Therefore, an adaptive learning mechanism of view weight based on variant information entropy is proposed to learn the weight of each view and reduce the view whose view weight is less than a certain threshold through preset rules to eliminate their negative impact on the classification results. For the training data set $\boldsymbol{D}$, the perspective weighting mechanism can be expressed in the form shown in

$$\begin{aligned} \varnothing = {} & \frac{\beta}{2} \sum_{m=1}^{M} \omega_m \delta_m \sum_{c=1}^{C} \sum_{i=1}^{N} \left[\left(\mathbf{p}_{g,c}^{m}\right)^{T} x_{gi}^{m} - \mathbf{y}_{ic} \right] \\ & + \frac{N}{C} \sum_{m=1}^{M} \omega_m \log_2 \delta_m \omega_m, \end{aligned} \tag{3}$$

$$\sum_{m=1}^{M} \omega_m = 1, \quad 0 \leq \omega_m \leq 1, \tag{4}$$

where $\mathbf{y}_{ic}$ indicates that the ith text vector belongs to class c, $\boldsymbol{\omega} = [\omega_1, \omega_2, \ldots, \omega_M]$ represents the view weight vector, and ω_m represents the weight of the m ($m = 1,2, ..., M$) viewing angle. δ_m is the control weight ω_m learning parameters, parameter β is used to control the contribution degree of $\boldsymbol{\Phi}$, and the value of the user's contribution is obtained through the cross validation of the data set. In equation (3), parameter β can change the coefficient of the function, and the total value of the function can be adjusted by setting the value of parameter β.

In the field of probability and statistics, the variance mean ratio (VMR) is usually used to observe the dispersion degree of samples. The smaller the VMR value, the more aggregated the samples are, and vice versa. In (3), it is expected that through item 2, the perspective containing dispersion characteristics can obtain small weight. Therefore, in this paper, the reciprocal form of VMR, i.e., mean variance ratio (RMV) is used as δ_m to realize the control of each perspective weight learning.

In order to reduce the perspective with small weight in the classification process, it is necessary to formulate reduction rules. Therefore, $\sum_{m=1}^{M} \omega_m = 1$ is set in the text to reduce the mth angle of view.

2.3. Objective Function and Its Optimization. Based on the above coordination mechanism and perspective reduction mechanism, we should pay attention to the impact of various factors on the function and optimize and analyze the data according to the specific situation of each perspective. Then, the objective function based on VR and Internet of things technology can be expressed as

$$\begin{aligned} J\left(p_{g,c}^{m}, \omega\right) = {} & \frac{1}{2} \min \sum_{m=1}^{M} \sum_{c=1}^{C} \left(p_{g,c}^{m}\right)^{T} p_{g,c}^{m} + \frac{\alpha}{2} \sum_{m=1}^{M} \sum_{c=1}^{C} \sum_{i=1}^{N} \\ & \cdot \left[\left(\mathbf{p}_{g,c}^{m}\right)^{T} x_{gi}^{m} - \frac{1}{M-1} \sum_{l=1, l \neq m}^{M} \left(p_{g,c}^{l}\right)^{T} x_{gi}^{l} \right] \\ & + \frac{\beta}{2} \sum_{m=1}^{M} \omega_m \delta_m \sum_{c=1}^{C} \sum_{i=1}^{N} \left[\left(\mathbf{p}_{g,c}^{m}\right)^{T} x_{gi}^{m} - \mathbf{y}_{ic} \right] \\ & + \frac{N}{C} \sum_{m=1}^{M} \omega_m \log_2 \delta_m \omega_m. \end{aligned} \tag{5}$$

The solution of (5) can be regarded as a minimum problem of convex function under constraints. Therefore, the Lagrange multiplier can be introduced as λ. The Lagrange objective function is constructed to obtain $\mathbf{P}_{g,c}^{m}$ and ω iterative expression. The Lagrange objective function constructed is

$$L = J\left(\mathbf{p}_{g,c}^{m}, \boldsymbol{\omega}\right) + \lambda \left(1 - \sum_{m=1}^{M} \omega_m \right). \tag{6}$$

By differentiating (6), the iterative expression $\mathbf{P}_{g,c}^{m}$ can be obtained, as shown in

$$\begin{aligned} & \left[\delta_m \omega_m \sum_{i=1}^{N} \left(x_{gi}^{m}\right)^{T} x_{gi}^{m} + \beta I_{(2K)\times(2K)} + \alpha \sum_{i=1}^{N} x_{gi}^{m} \left(x_{gi}^{m}\right)^{T} \right] \\ & \times \left(\delta_m \omega_m \sum_{i=1}^{N} x_{gi}^{m} y_{ic} + \frac{\alpha}{M-1} \sum_{l=1, l \neq m}^{M} \sum_{i=1}^{N} x_{gi}^{l} p_{g,c}^{l} \right), \end{aligned} \tag{7}$$

where K is the number of fuzzy rules, which represents the value limit of the constrained convex function, has the function of modifying the function, and can obtain the

optimal solution. Based on the iterative expression of $\mathbf{P}_{g,c}^{m}$, the optimal solution can be obtained by iterative optimization. When the perspective needs to be reduced, (8) is used to update the perspective weight to continue to meet the constraint of sum 1:

$$\omega_m^{'} = \frac{\omega_m}{\sum_{m'=1}^{M'} \omega_m^{'}}, \tag{8}$$

where $w_m^{'}$ w represents the updated view weight and M' represents the total number of perspectives after reduction.

After obtaining the optimal $\mathbf{P}_{g,c}^{m}$ and $\boldsymbol{\omega}$, then, for the decoration process text vector $\boldsymbol{x}_i = [x_i^1, x_i^2, \ldots, x_i^M]$ that needs to predict the category, the final classification function $f(\boldsymbol{x}_i)$ can be defined as the linear combination of the classification results of each perspective, as shown in

$$f(\mathbf{x_i}) = \sum_{m=1}^{M} \omega_m \left(\mathbf{p}_{g,c}^{m}\right)^T \mathbf{x}_{gi}^{m}. \tag{9}$$

The detailed training steps of the algorithm combining VR and the Internet of things are described as follows. Input: fuzzy rule number K, regularization parameter α and β, the iteration stop threshold ε. Output: $\mathbf{P}_{g,c}^{m}$ and $\boldsymbol{\omega}$. The process is as follows: (1) initialize the angle weight vector $\boldsymbol{\omega}$, and the $\omega_m = 1/M$. (2) Using the fuzzy $\boldsymbol{C}$ means clustering algorithm, and the antecedent parameters of the fuzzy rules of VR and the Internet of things in each perspective are obtained, so the consequent parameters are obtained. (3) Compute using Internet of things technology to calculation δ_m. (4) Use (7) to find $\mathbf{P}_{g,c}^{m}$. (5) If m exists, make $\omega_m \leq 1/M$; the mth viewing angle is approximately reduced, and $M = M-1$. (6) Update ω_m with (8). (7) If the objective function value $J(\mathbf{P}_{g,c}^{m}, \boldsymbol{\omega})$ of two adjacent times is less than ε, then the algorithm stops. Otherwise, skip to Step (3) to continue.

2.4. System Construction of Isomorphic Block Decoration in Fashion Design Based on the Combination of VR and Internet of Things. The system of homomorphic block decoration in fashion design based on the combination of VR and Internet of things is the design and application platform of homomorphic block decoration in clothing. By studying the application of isomorphic block decoration, we can realize the diversified functions in fashion design, which plays an inestimable role in the modernization and development of fashion design.

The clothing design system based on the combination of VR and the Internet of things is a 3D model management platform for the same shape block decoration and clothing. The real-time browsing of the 3D model is realized through the deep secondary development of the Internet of things technology. Taking the Internet of things technology as the basic 3D display platform, it can seamlessly integrate the virtual simulation teaching, student creation, information management system, and remote equipment monitoring system; deliver necessary information; and perform associated actions. Then, through VR technology, we can realize the virtual experience of clothing, enhance the user's sense of experience, and achieve the purpose of promoting clothing. It is worth noting that we should give full play to the technical advantages of the combination of VR and the Internet of things, consider the influencing factors of each isomorphic block decoration, and combine the characteristics of city fashion design, so as to achieve the smooth establishment of the platform. The platform flow chart of isomorphic block decoration in fashion design based on the combination of VR and Internet of things is shown in Figure 1.

3. Application Analysis of Isomorphic Block Decoration Based on the Combination of VR and Internet of Things in Fashion Design

3.1. Application of Isomorphic Block Decoration in Clothing Color. Human response to color involves subjective emotion and personal judgment, and the cognition of color harmony is affected by more factors. Color harmony can be divided into: contrast color, complementary color, similar color and multicolor harmony. In this case, the theory of color harmony advocates the simulation of natural colors as the basis of color pursuit, through the proper processing of color changes and the formation of coordinated color collocation, so that the audience can get a pleasant visual experience. The harmony of contrasting colors refers to the coordination effect of two colors with far different properties, especially the two opposite colors in the color ring, which are configured by some specific methods and laws. The harmony of similar colors refers to the unified and coordinated effect formed by maintaining one or two parameters of purity, lightness, or hue unchanged and changing other parameters to achieve hierarchical changes when configured with color phases with similar properties.

Figure 2 shows the application of the same shape block decoration in the clothing color between different cities. The score is the lowest among the three colors and similar colors, which shows that they have the lowest score in the application and comparison of colors in a wide range of cities. The main reason may be that contrasting tones can create lively visual effects, while similar tones can enhance the integrity of colors and highlight the beauty of harmony. Human beings can perceive millions of hues, and the possibility of color combination is unlimited. In the design of block decoration, we can try a variety of colors to carry out the blending test, which can not only highlight the sense of boundary between blocks, but also enrich the overall visual effect.

The printing design of isomorphic block decoration can be divided into two types according to the visual effect: positioning printing and dislocation printing. The production process of mosaic decorative sheet can be compared with that of puzzle. The similarity is that both of them complete printing before module cutting. The difference is that the shape and socket of each puzzle are unique, while the shape and socket of mosaic are fixed, unified, and universal. The process of completing the "jigsaw puzzle" is to restore the image fragments to the splicing state before cutting, and the corresponding block decoration is positioning printing. In the design of positioning printing, it is necessary to clarify

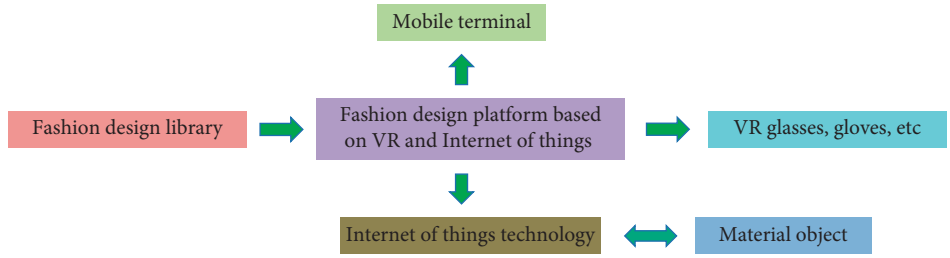

Figure 1: Platform flowchart of isomorphic block decoration in fashion design based on the combination of VR and Internet of things.

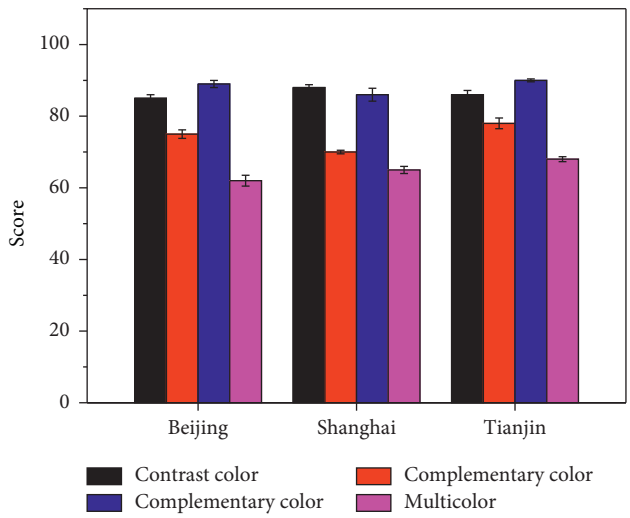

Figure 2: Application of isomorphic block decoration in clothing color between different cities.

the size of the block and the size of the image and consider the position of the dividing line to ensure that the final image is complete. The printing effect becomes more dislocation and more free. The content of printing can be a complete picture or a pattern. When assembling, it will deliberately avoid the correct arrangement order and pursue the effect of dislocation and fragmentation.

Figure 3 shows the proportion of printing design of isomorphic block decoration between different cities. It can be seen that the printing design of isomorphic block decoration in Beijing is mainly positioning printing, while the proportion of positioning printing in Tianjin is the lowest and the proportion of dislocation printing is the highest. The positioning printing is higher than the dislocation printing in the same shaped block decoration in Shanghai. The main reason for this is that the pursuit of clothing is different among cities, resulting in different clothing culture. In addition, due to the different preferences of people in cities for isomorphic block decorative printing design, it also leads to the difference in the proportion of printing. Therefore, in the process of fashion design, we should fully consider the differences of urban culture and people's hobbies and develop the garment industry according to local conditions.

There are three factors that affect the modeling style of isomorphic block decorative clothing: block shape, block material, and connection technology. When the block shape is flower shape, there are many and dense blocks, which are highly decorative and visual, and are deeply loved by people. When the block material is plastic metal ring, the thickness and hardness of the block shape the modeling sense of clothing, with a strong sense of the times and good affinity. When the connection process is plug-in, the outline of the dress is loose and fit, and the thickness of the block combined with the plug-in method can enhance the three-dimensional feeling of the dress. Generally speaking, in the design of isomorphic block decoration based on VR and Internet of things in clothing, the style of isomorphic block decoration should be determined according to the design purpose and application prospect of clothing. Most importantly, people in different cities have different design wishes for the same shape block decoration. Therefore, it is urgent to study the application prospect of the same shape block decoration in different cities.

The function simulation value of isomorphic block decoration between different cities based on the combination of VR and Internet of things over time is shown in Figure 4. It can be seen that the function simulation value based on the combination of VR and Internet of things obtained at the beginning of the three cities is low, and the development of isomorphic block decoration among the three cities is similar, mainly because it takes a certain time to adapt to the local clothing culture. Then, when the time increases to about 120 days, the simulation values between the three cities begin to rise rapidly and reach a stable state at 180 days. With the continuous increase of time, the function simulation values are in a stable state and tend to decrease slightly. It is worth noting that the simulation value of fashion design function based on the combination of VR and Internet of things is almost the same between Beijing and Shanghai, while Tianjin is the lowest. The main reason may be related to the local development level. The economic capacity and scientific research strength of Beijing and Shanghai rank among the top two in China. The people's living standard is high, and residents are interested in studying the matching and design of clothes decorated with different isomorphic blocks. The economic level and scientific research strength of Tianjin are low, and the people's quality of life is general. There is no time to study the application of isomorphic block decoration in fashion design, which leads to the reduction of function simulation value. If the function simulation value based on the combination of VR and Internet of things changes slowly with time, it shows that the application of isomorphic block decoration in fashion design in the city is low, which is less conducive to the long-term development of fashion design industry. Therefore, in order to better solve the application

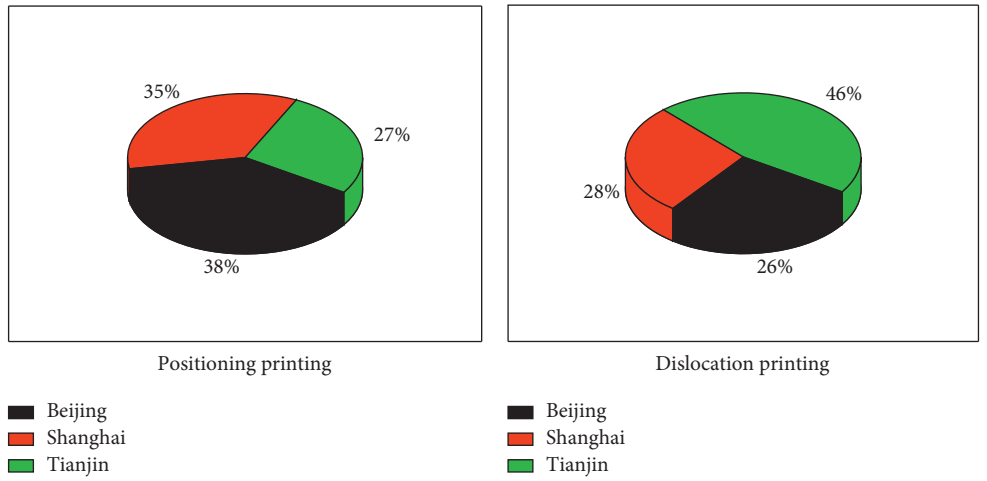

Figure 3: Proportion of printing design of isomorphic block decoration between different cities.

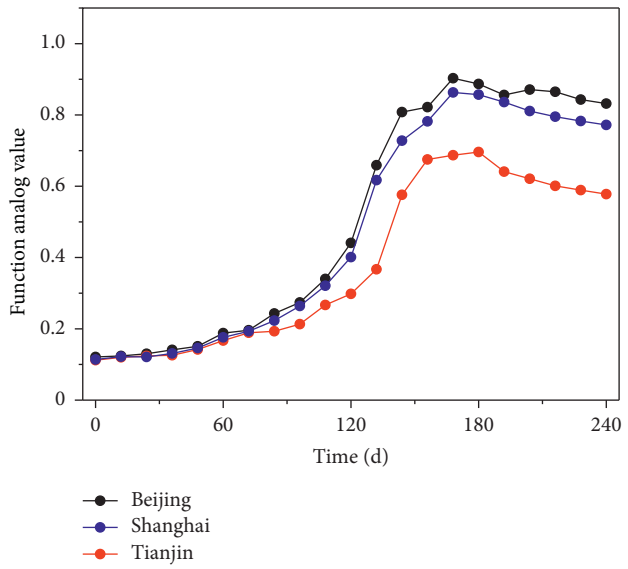

Figure 4: Function analog value of isomorphic block decoration between different cities over time based on the combination of VR and Internet of things.

prospect of isomorphic block decoration in fashion design, we should develop the local economic level according to local conditions and stimulate people's consumption, so as to achieve the large-scale application of isomorphic block decoration in fashion design.

As we all know, the isomorphic block decoration structure has attracted the attention of environmentalists because of its flexible disassembly performance, which can complete the replacement of locally damaged parts. In order to prolong the service life of clothing, the resource consumption should be reduced. The latest research content is based on the optimization of decoration structure and the application of environmental protection materials. On the other hand, the commercial value of block decoration structure has been confirmed. In foreign countries, some designers have launched a series of clothes with this process as the design point, which has been recognized by consumers and stable economic benefits in the market. It can be seen that the concept of leading fashion design with the research of isomorphic block decoration is novel and in line with contemporary aesthetics, which has a certain reference value for the domestic ready-made clothing market. Therefore, the realization rate of isomorphic block decoration based on the combination of VR and Internet of things in fashion design is extremely important.

Figure 5 shows the implementation rate of isomorphic block decoration between different cities in fashion design based on the combination of VR and Internet of things. It can be seen that with the increase of time, the realization rate of isomorphic block decoration in fashion design between different cities shows a trend of gradually increasing at first and then slowly decreasing. Among them, the realization rate of isomorphic block decoration in fashion design in Beijing is the highest, followed by Shanghai, which is not much different from that in Beijing, while Tianjin is the lowest. The main reason may be related to the local economic and cultural differences. As the capital of China, Beijing has developed economy and high people's income. As the fashion capital of Shanghai, local residents like to accept new things, especially in fashion design. Everyone flocks to it, so the realization rate of the two cities is high. Tianjin's economy is relatively backward, and its culture is not prosperous. Local residents accept less clothing fashion, so its realization rate is low. This is consistent with the analysis results in Figure 4. Therefore, in order to better ensure the realization rate of isomorphic block decoration in fashion design, we should vigorously develop the local economy and popularize the clothing fashion culture to local residents, so as to improve the realization rate.

According to the above research results, the isomorphic block decoration based on the combination of VR and the Internet of things is practiced in fashion design, so as to transform the previous theoretical results into design products through practical application. Among them, the practice of fashion design consists of three parts. The first part is to determine the design theme and style; collect data according to inspiration; and select the color, pattern, technology, and

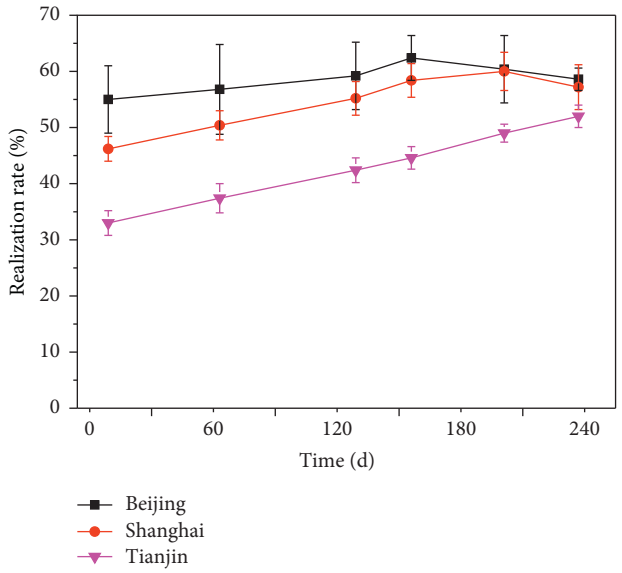

Figure 5: Realization rate of isomorphic block decoration between different cities in fashion design based on the combination of VR and Internet of things.

material suitable for the series theme. The second part is to draw a sketch and convert the sketch into a sample garment. At the same time, the ready-made fabric is used for the printing, laser cutting, and insertion test of the ready-made garment, and the design is modified according to the manufacturing process until the sample garment is finally determined. The third part is the production of ready-made clothes, to improve the details of ready-made clothes, complete the production of accessories, and shoot ready-made clothes. For fashion design, the first part is the most important and core content. The color, pattern, technology and material of isomorphic block decoration will greatly affect the experience of fashion design. Therefore, it is necessary to study the integration rate of various factors of isomorphic block decoration.

The fusion rate of various factors of isomorphic block decoration in fashion design between different cities is shown in Figure 6. It can be seen that for Beijing, local residents pay more attention to the color, technology, and material of isomorphic block decoration, while Shanghai citizens pay more attention to pattern, technology, and material, while Tianjin citizens mainly pay more attention to technology and material. The main reason for this situation may be that the culture and openness of different cities affect the different preferences of local residents for the decoration of isomorphic blocks, resulting in different integration rates of isomorphic blocks. Therefore, it is necessary to carry out the production of corresponding isomorphic block decoration according to the local actual situation, so as to achieve the perfection of garment design and promote the rapid development of garment industry.

The application of isomorphic block decoration in clothing modeling can be divided into two directions according to style: conceptual clothing and daily clothing. In the design of conceptual clothing, materials that can support three-dimensional structure, such as nonwoven fabric and leather, can be used to shape a wide profile and achieve

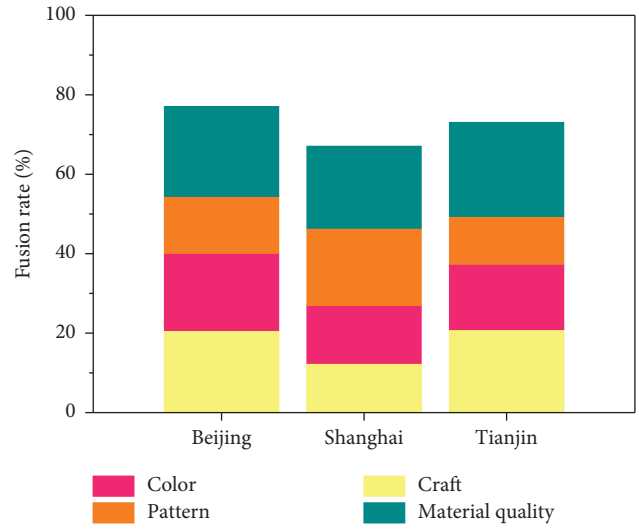

Figure 6: The fusion rate of various factors of isomorphic block decoration in fashion design between different cities.

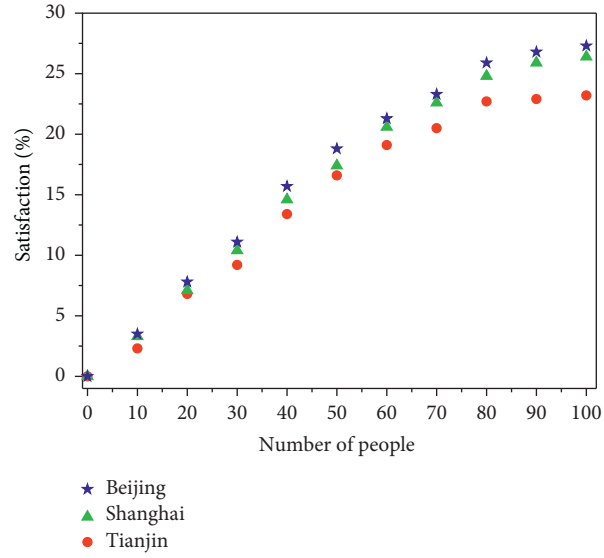

Figure 7: Statistics on the satisfaction of different urban residents in fashion design based on the combination of VR and Internet of things.

exaggerated visual effect. In the design of daily clothing, the assembly of block decorative pieces can be completed first, and then the style design can be carried out according to its shape. The combination decorative pieces have a high degree of fit with the flat cut clothes pieces, which can bring a lot of creative inspiration. The garment silhouette is mainly loose. In case of fit cutting part, the dart can be replaced by reducing the number of blocks and changing the shape of blocks to complete the contraction of the structure.

The statistics of satisfaction degree of isomorphic block decoration based on the combination of VR and Internet of things in fashion design of different urban residents are shown in Figure 7. It can be seen that with the increase of the number of statistics, the satisfaction of different cities shows

a stable trend after gradually increasing, the satisfaction of residents in Beijing is the highest, followed by Shanghai, and the satisfaction of residents in Tianjin is the lowest in fashion design. The main reason may be the different pursuit of clothing among residents in different cities, which also leads to the difference of their satisfaction, but the satisfaction values among the three cities are not different. The satisfaction of residents in different cities reflects the popularity of isomorphic block decoration in fashion design. If the satisfaction of residents is high, the development of the city's fashion design industry will be better. Based on this, we can adjust the development direction of the fashion design industry, so as to promote the prosperity of clothing. Therefore, the realization of isomorphic block decoration based on the combination of VR and the Internet of things in fashion design needs to be brought into play according to the economic level and hobby of local residents, so as to contribute to the rapid development of fashion design.

4. Conclusion

With the development of VR and Internet of things technology, the diversification of isomorphic block decoration has been brought into full play, which is conducive to the rapid development of garment industry. Based on VR and Internet of things technology, this paper discusses the implementation process of VR and Internet of things algorithm. With the establishment of the platform based on VR and Internet of things technology; finally, the isomorphic block decoration based on the combination of VR and Internet of things is compared in different cities. The results show that VR and Internet of things technology can predict and analyze the isomorphic block decoration and promote the development of fashion design industry. At the same time, fashion design should be carried out according to the local residents' preferences and economic ability, so as to better realize the diversification and characteristics of fashion design.

Data Availability

The data set used to support the findings of the study can be accessed upon request.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

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