

## Research on Inheritance and Innovation Performance of Modern Fashion Design Based on Data Mining

Chenglong SONG, Rui Wang

Jiujiang University, Jiujiang, Jiangxi, 332005, China

### Abstract

*With the rapid development of social economy, people's living standards and quality of life continue to improve, more and more people pay more attention to dress, they expect to show their own taste and values with personalized dress. This paper discusses the main problems existing in the development of modern fashion design, and puts forward the application of data mining (DM) in fashion design. The essential differences between Chinese and western traditional costumes and the specific measures of designing costumes with national characteristics are discussed emphatically, and the significance of carrying out the research on inheritance and innovation performance in modern costume design is summarized, so as to complete the research on inheritance and innovation performance in modern costume design and continuously promote the perfect development of modern costume design in China.*

**Keywords:** *Dm, Modern clothing design, Inheritance and innovation*

### I . Introduction

Since the development of traditional Chinese clothing, the profound meaning and strong feelings contained in traditional clothing have disappeared. From the fashion trends pursued by modern people, it is difficult to see the image and emotion of traditional culture itself. Although the clothing itself has the appearance of traditional clothing design, it has no spiritual connotation. It is only an excerpt and imitation of traditional clothing design. Therefore, the designed clothing is superficial and empty, lacking in connotation. The reason is that contemporary fashion designers lack a deeper understanding of traditional culture and cannot truly appreciate the spiritual connotation of traditional culture, thus failing to convey the deep emotions contained in traditional cultural elements [1]. In the 1990s, China has become the world's largest garment producer, exporter and potential consumer market. After the development of reform and opening up, China's influence and status in the international community continue to improve, and more and more shadow of Chinese traditional cultural elements appear in the international fashion [2]. This is the pride of our nation, but the wrong interpretation of traditional culture will make people laugh and be generous. Therefore, we should dig deep into the connotation of traditional culture, and let the precious spiritual wealth accumulated for more than 5,000 years play its due dazzling brilliance in modern fashion design, which is not only the inheritance of traditional culture, but also the sublimation and re-creation of it, which will provide new ideas for modern fashion design [3]. As a kind of culture, costume has a colorful and long history. Different regions, different politics and different national customs have created different national costume cultures [4].

Due to the continuous exchanges between international regions in the modern society, clothing is becoming more and more concise and practical following the needs of the times, and the nationality and tradition of clothing are gradually blurred. For example, contemporary Eskimo costumes have become a blend of modern ready-to-wear elements. In Northwest China, you can see many ethnic minorities wearing square hats and woolen vests while wearing a pair of modern leather shoes on their feet. Inheritance and innovation is the only way for the cultural development of all countries in the world, and the same is true for the development problems faced by modern Chinese clothing design [5]. If China wants a space for one person to promote internationalization of China's modern fashion design, we must discuss its tradition and nationality, constantly absorb the essence of traditional fashion design, combine the new elements of the current era, and make deep innovations in China's fashion design,

so that China's clothing design can always take a place in the trend of the times. [6] In recent years, DM technology is changing the way of human information management with a new concept. It combines the technologies in many fields, such as database technology, artificial intelligence, machine learning, statistical analysis, pattern discovery, visualization technology, information retrieval and signal processing, etc., which makes people change from simply collecting, sorting, organizing, storing, disseminating and utilizing information to deep processing such as information reconstruction, information integration and knowledge innovation, and makes information processing technology enter a more advanced stage [7]. In order to make the development of clothing industry keep up with the trend of modern science and information technology, using DM technology to discover the knowledge and information hidden in every link of clothing field has become a research hotspot [8].

## II. Modern Clothing Design Inheritance and Innovation Performance

### A. A Probe into the Origin of the Differences between Traditional Chinese and Western Costumes

From the perspective of the Chinese nation, it is obviously unrealistic to blindly imitate the cultural consciousness of certain western countries. Any artistic development will undergo a process of inheritance, innovation, inheritance, and re-creation [9]. Inheriting tradition is not only the direct imitation and utilization of traditional styles, but also the innovative treatment of them with modern methods creatively [10]. To be able to inherit and innovate well, we must first understand the differences in clothing space awareness between the East and the West [11]. Clothing is a state after the human body is dressed, and the human body is a three-dimensional image. When people cover the two-dimensional fabric on the human body, clothing becomes a clothing form with three-dimensional space, and the traditional Chinese expression of this three-dimensional clothing is different from the Western expression.

First of all, China and the West have different ways of observing space things. Westerners stand at a fixed point and observe things from a fixed angle. Western clothing space consciousness, which gradually formed and developed from the Middle Ages, clearly reflects the westerners' psychology of exploring space from one aspect-full of infinite expansion consciousness, more precisely, it should be the psychological motivation of "self-expansion" [12]. Chinese traditional space consciousness is a rhythmic space consciousness of "self-satisfaction", and the viewpoint moves with one's own wishes. Therefore, the space consciousness of Chinese art is expressed by the rhythm of "virtual and real" and "bright and dark", and so is the space consciousness of Chinese costumes. Generally speaking, when people observe things around them, they pay different attention to the shape of things [13]. Baxter's theory believes that the observation of objects can generally be divided into two stages: the first stage is the perception of the overall impression through rapid scanning, which is called the pre-attention stage. The second stage is to pay attention to the details of interest [14]. In the survey, it was also found that most customers' attention to objects is a process from the whole to the part. Table 1 is a summary of the characteristic elements of suit styles. The extraction of the characteristic elements of clothing provides a basis for style recommendation.

*Table 1 Main Characteristic Elements of Suits and Their Values*

Characteristic elements	Value
Style	Gentleman's formal wear, business casual, stylish casual
Colour	Black, navy blue, gray, brown, brown, khaki, dark green
Fabric	Wool, cotton, linen, notoginseng
Placket	One single-breasted, two single-breasted, three single-breasted, six double-breasted
Bifurcation	Double split, no split, back center split

Collar type	Flat collar, cut collar, narrow collar
Board type	Slim, straight, waist, loose

Chinese traditional clothing is concerned with the use of non solid three-dimensional scale to obtain a self textured, harmonious and unified space state. Although this space form does not have a clear concave convex three-dimensional, on the contrary, it is similar to a plane, but the changes of rhythm lines in the movement of clothing create a lively and vivid three-dimensional effect of far and near, virtual and real. This kind of plane-cut clothing modeling tends to be holistic, which can give people a feeling of expanding the horizon space from a psychological point of view. Therefore, in the overall spatial form, it does not have diverse solid geometry and visual emphasis, but tends to approximate the plane geometry as a whole. This form brings a larger psychological horizon space than western costumes.

### ***B. Inheritance and Innovation Performance***

With the constant impact of the trend of the times, Chinese clothing design has been greatly developed. However, since the development of modern clothing design is in its infancy, there are still certain shortcomings in the development of modern Chinese clothing design. First of all, in the field of Chinese fashion design, there are some designers who do not really understand the traditionality and nationality of fashion design, and lack the inheritance of traditional fashion design. This is extremely unfavorable for the development of modern fashion design with Chinese characteristics. Secondly, as another form of cultural expression, clothing reflects the cultural heritage of a country all the time. Countries and nationalities with different geographical locations and customs have different styles of clothing. Therefore, the diversification of fashion style and fashion design is created. However, in the development of China's modern fashion design, there is a lack of certain national color, which directly reduces the recognition of China's modern clothing and has a negative impact on the design of modern clothing with Chinese national characteristics.



*Fig.1 Fashion Design Leads the New Era*

Furthermore, the combination of traditional elements and modern elements is lacking in Chinese modern fashion design, which makes it difficult to promote the times of modern fashion, and even lacks the display of the cultural heritage of traditional fashion design. Traditional fabrics are combined with traditional crafts to create a unique costume image. In inheriting tradition, Issey Miyake, a Japanese fashion designer, can be described as a model in the fashion field. He has always implemented the intention of “discovering the latent spirit behind the kimono” in his design. He uses traditional Japanese fabrics and craftsmanship to create unusual new visual effects. The design of his works not only contains the characteristics of traditional Japanese kimono. Moreover, it integrates the characteristics of western clothing, and deeply combines tradition and modernity, creating an unprecedented unique clothing style that combines history and avant-garde. This is why he has a place in clothing.



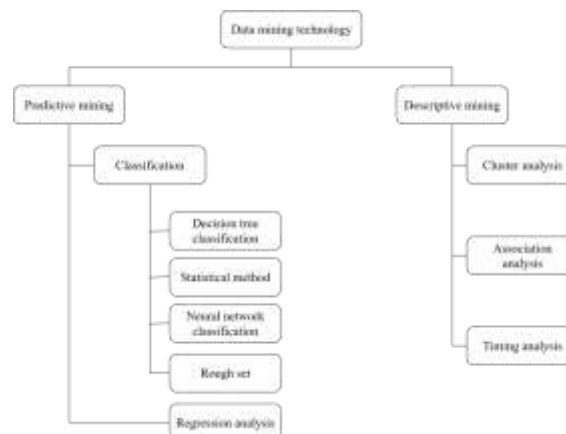
*Fig.2 Cheongsam Design*

His works have a strong sense of three-dimensional, which is related to his early education in western design. The combination of eastern tradition and Western design is the inspiration of Mitsuya's life. The improved Qipao is the product of the combination of Chinese and Western walls. So in the sixth brothers cup, "old clothes are hard to be found" is to reproduce this move. In this design, the designer reproduces a group of women's fashions in old Shanghai in the 1920s. The basic style of clothing is cheongsam, but the designer can make such "improvement" of cheongsam, which can be said to be his boldness in design, and this is also what moved many judges.

### III. Research on the Inheritance and Innovation of Dm's Modern Costume Design

#### A. Dm

DM is to dig out the hidden mineral resources-knowledge from massive data. The term DM first appeared in the 11th International Joint Academic Conference on Artificial Intelligence-"Knowledge Discovery in Database" held in Detroit, USA in August, 1989. With the development and maturity of technology, DM has been born for 20 years, but there is no fully accepted definition at present. Because DM technology has different applications in different fields, scholars and experts also define it from different angles. From the perspective of data analysis, DM can be divided into two categories: predictive DM and descriptive DM. Predictive DM analyzes the data, builds a model or a set of models, and tries to predict the behavior of the new data set. Descriptive DM can be divided into cluster analysis, association analysis and time series analysis: Predictive DM can be divided into classification and regression analysis. Descriptive DM describes the data in a concise and summary manner and provides useful general characteristics of the data. The specific relationship is shown in Figure 3.



*Fig.3 Classification of Data Mining Technologies*

DM is a complete and repeated human-computer interaction process, which needs to go through many interrelated steps. And because the analysis objectives and requirements of application fields are different, and the data sources and meanings are different, the steps will not be exactly the same. Generally speaking, DM process mainly includes five stages: data preparation. Data selection. Data preprocessing. DM. Transformation model and mode

evaluation. The basic steps of DM are shown in Figure 4.

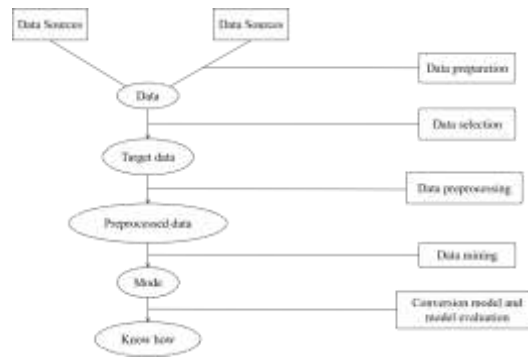


Fig.4 The Process of Data Mining

### B. Build Decision Tree Model

Among various decision tree algorithms, CLS learning algorithm and CART algorithm are the early ones. The most influential one is the ID3 algorithm proposed by Quinlan, which is the representative of decision tree algorithm, and most decision tree algorithms are improved and realized based on it. E.g. ID4 algorithm, C4.5 algorithm, SLIQ algorithm, SPRINT algorithm, PID algorithm, etc.

The ID3 algorithm uses a divide-and-conquer strategy and uses information gain to measure test attributes. The specific method is to detect all attributes, select the attribute with the largest information gain to generate decision tree nodes, establish branches from different values of the attributes, and then recursively call this method on a subset of branches to establish branches of decision tree nodes. Until all the subsets only contain data of the same category, a decision tree is finally obtained, which can classify new samples. The advantages of ID3 algorithm are: the theory of the algorithm is clear, the method is simple, the learning ability is strong, the average depth of the decision tree is small, the classification speed is fast, and it is suitable for large-scale data processing.

According to the requirements of clothing style recommendation and the characteristics of this system, in the implementation process, the ID3 decision tree classification algorithm is mainly used to construct the style preference model.

Let  $s$  be a set containing  $s$  sample data, and assume that its category attribute has  $m$  different values, which are defined as  $\{C_1, C_2, \dots, C_m\}$  and  $S_i$ , which is the number of samples in the category  $C_i$ . Then, the expected information required for classifying a given sample is:

$$I(S_1, S_2, \dots, S_m) = -\sum_{i=1}^m P_i \log_2(p_i) \quad (1)$$

Among them:  $P_i = S_i / S$ , represents the probability that any sample belongs to class  $C_i$ . Assuming that the condition attribute  $A$  has  $n$  different values  $\{a_1, a_2, \dots, a_n\}$ , then  $A$  can be used to divide  $S$  into  $n$  different subsets  $\{S_1, S_2, \dots, S_n\}$ . Among them, the value of the sample in  $S_i$  on  $A$  is  $a_i$ . If  $A$  is selected as the test attribute (i.e. the best split attribute), then these subsets correspond to the branches growing from the nodes containing set  $s$ . Let  $S_{ij}$  be the sample number of the class in the subset, then the expected information and information gain of the sample set divided by  $A$  are as follows:

$$E(A) = \sum_{j=1}^n \frac{S_{1j} + \dots + S_{mj}}{S} I(S_{1j}, S_{2j}, \dots, S_{mj}) \quad (2)$$

$$Gain(A) = (S_1, S_2, \dots, S_m) - E(A) \quad (3)$$

Note that for a given subset  $S_j$ , there are:

$$I(S_1, S_2, \dots, S_m) = - \sum_{i=1}^m P_{ij} \log_2(P_{ij}) \quad (4)$$

Where:  $P_{ij} = S_{ij} / |S_j|$  is the probability that the sample in the  $S_j$  belongs to the class  $C_i$ .

At the beginning of construction, the decision tree is empty, and we don't know how to select test attributes to divide the sample space well. Therefore, the attribute with the maximum information gain is selected as the test attribute of the current node by using the method of information gain measurement. This attribute makes the amount of information required for the sample classification in the result partition minimum, and reflects the minimum randomness or "impure" of the partition. This approach minimizes the number of expected tests required for a classification and ensures that a simple (but not necessarily the simplest) tree is found.

### ***C. Combine the Traditional Craft of Method and Innovation's Clothing with Materials to Create a New Clothing Image***

From the works of some famous foreign designers, such as Fei Lei, Lagrou Wa and Xia Naier, we can see the visual effect set brought by the innovation of clothing fabrics, even if the traditional styles and traditional technological methods are greatly improved, then a piece of work can shine brightly, thus showing the importance of fabric innovation. The innovation of clothing fabrics can be two-dimensional or three-dimensional. In two dimensions, such as: to innovate the patterns on the fabric. To innovate the color matching of fabrics, to innovate the light feel and feel of the fabrics, these are all innovations in the plane. Three-dimensional innovations, such as wrinkling the fabric. Foaming, shirring, making a variety of three-dimensional shapes, etc., so that the fabric of the clothing is unique, and its overall effect will also be unique. It is precisely because designers use traditional technology to create new and unique fabrics, and create a group of "plane" and "three-dimensional" combination of the stock decoration image, making the works overwhelmingly won the gold medal. The inspiration is that the innovation on fabric is really touching. In the innovation of fabric, we can choose different traditional technology, and breakthrough from fabric can achieve the special effect we expect. China is a country with a long history. Traditional costumes are not only owned by the Han nationality, but also have 56 flowers from 56 ethnic groups. The costumes of 56 ethnic groups have merged into our colorful traditional costume culture in China. We should go deep into wider areas, dig out more exploring costume cultural traditions, and combine them with modernity and western costumes, so that our designs have newer creativity.

## **IV. Conclusions**

With the gradual deepening of the common characteristics of national costume culture, the national style can no longer appear in a pure form and needs to be more manifested as a combination of the characteristics of the times, diversity and the ambiguity of boundaries. For a country or nation to form an artistic style that has both the characteristics of the times and the cultural heritage, it must constantly absorb the essence of traditional culture. DM technology is an important means of product design innovation. This paper expounds and analyzes DM decision tree technology and algorithm, builds the target customer information based on the clothing industry, and finds out potential customers from the target customer data source by establishing the decision tree algorithm model. In addition, by studying the inheritance and innovation of modern fashion design, we can guide more fashion designers to learn and carry forward the essence of Chinese traditional culture, encourage them to expand their innovative thinking, enhance the innovative ability of modern fashion design, and further promote the steady development of modern fashion design in China.

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