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Computer-Aided Design AND APPLICATIONS

Emotional Colour Matching of Exhibition Hall Layout by Aesthetic Experience Theory

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Abstract. With the continuous improvement of people's life quality, more and more people begin to pay attention to the beauty and spiritual connotations in daily life. For the exhibition design of the exhibition hall, the colour structure has become an indispensable important factor, from the perspective of colour matching, the exhibition hall mainly involves the environmental colour and the theme colour. Environmental colour is an important subject as a foil, which can highlight the exhibition effect and atmosphere of the exhibition hall. With the support of aesthetic experience theory, this paper uses CAD and big data analysis technology to design and analyze the emotional colour collocation of the exhibition hall. First of all, based on the aesthetic experience theory, the aesthetic connotation of the exhibition hall is studied, the basic points of the exhibition hall colour matching are clarified, and the overall space structure of the exhibition hall is combined to provide help for the colour matching design. Using big data analysis to study the emotional factors of exhibition hall layout. Colour is also the first impression to express emotion. Using the method of data analysis and processing, the changes of mass emotion under the colour collocation of different exhibition halls are explored. Finally, CAD technology is used to generate the colour-matching design scheme under the influence of the emotional layout of the exhibition hall, optimize the traditional colour design process, and build a computer-aided colour design tool. The color emotion as the driving factor of design, improves the quality of group feedback on the exhibition hall layout. The research results show that CAD and big data analysis technology can help optimize the colour-matching design and improve the quality and effect of colour-matching based on the support of aesthetic experience theory.

Keywords: Aesthetic Experience Theory; CAD Technology; Big Data Analysis; Exhibition Hall Layout; Color Matching
DOI: https://doi.org/10.14733/cadaps.2025.S9.40-52

1 INTRODUCTION

In the development of modern society, aesthetics and aesthetic feeling have had a profound impact in many fields, and aesthetics is a common word in aesthetics [1]. There were philosophers in ancient Greece who thought about what beauty was and how to appreciate it. Aesthetic experience theory is a summary of experience generated by the integration of psychology, philosophy, aesthetics, and other disciplines [2]. It is not only the core of design industry in the early stage but also the basis for design optimization in the later stage. Aesthetic objects appear in daily life, constantly breaking through their own aesthetic ceiling. The design and construction of many exhibition halls are decorated with painting decorations, and ordinary decorative objects will stand out from the image background when perceived by people [3]. Therefore, the design and structure of the exhibition hall are also required to be independent and have a unique aesthetic. Most of the traditional exhibition centre space is composed of hard design. Mainly in the interior decoration, such as paint, chandelier, wire, equipment, and other objects. Compared with the soft design that can be moved at any time, the choice of colours for hard installation products is less, which also greatly limits the beauty of the interior space of the exhibition hall [4]. In order to meet the emotional needs of modern people for the exhibition hall, the exhibition hall needs to pay attention to the colour collocation during the exhibition process, and it is necessary to combine age, accomplishment, interest, hobby, aesthetic, experience, emotion and other factors of the exhibitors. Different groups of people show different emotional needs, which requires designers to take various emotional factors into account when matching colours for different pavilions [5].

At the same time, whether the exhibition design of the exhibition hall can reflect the best effect also depends on the choice of the interior colour and space background of the exhibition hall [6]. As a designer, the theme should be embellished by combining pavilion layout, pavilion design, content and spatial characteristics. Reasonable colours are used to create the atmosphere of the exhibition to ensure that visitors can quickly enter the atmosphere of the exhibition hall when they enter the exhibition hall [7]. From the design point of view, the exhibition hall should be divided into multiple aspects, in addition to ensuring the rationality of the spatial layout, but also to make the environmental atmosphere of the exhibition hall more suitable for the masses to visit. Colour design plays a major role in it, which can determine the external expression effect of exhibition design and reflect the spiritual connotation and aesthetic art to be conveyed by the exhibition hall. After entering the exhibition hall, visitors will also be primarily attracted by colour matching, which is due to the intuitive visual impact effect of colour, which can influence the vision and emotion of visitors to a certain extent. At this stage, scientific and technological means are used to design the colour collocation of the exhibition hall, and the theme colour of the exhibition is adjusted with the emotion of visitors as the main factor so that the colour collocation design is more suitable for the exhibition content and visitors. Therefore, the exhibition of the exhibition hall based on colour collocation should focus on the arrangement of different colour combinations to achieve the contrast effect of bright colours. At the same time, it is also necessary to analyze people's inner emotional changes and emotional impact and refer to the needs of the masses when carrying out colour matching [8]. When the visitors' emotional changes produce a strong reaction, the use of colour fusion highlights the spatial personality and environmental personality of the exhibition hall. Based on the theoretical environment of aesthetic experience, this paper uses CAD and big data analysis technology to study the emotional colour-matching design of the exhibition hall and is committed to exploring the impact of emotional changes of the masses on the interior colour-matching of the exhibition hall.

Introducing CAD technology into the MEPCD system can significantly improve the efficiency and accuracy of product colour design. The theory of aesthetic experience emphasizes the subjective feelings and emotional responses of individuals when perceiving beauty. Apply it to the MEPCD system. In addition, the combination of CAD and big data analysis can quickly generate multiple colour schemes based on user preference data, providing designers with rich sources of inspiration [9]. Through big data analysis, we can uncover the emotional preference patterns of

users towards colors in different contexts and guide product color design to better meet the aesthetic needs and psychological expectations of target users. This means that we need to have a deeper understanding of the emotional differences in color perception among different users, and how these differences affect their purchasing decisions and user experience. The emotional colour matching in the exhibition hall layout is a successful practical case that demonstrates how to create a specific emotional atmosphere through carefully designed colour combinations, attracting and retaining visitors [10]. Colour design is not only about visual aesthetics but also about emotional communication and resonance. CAD can not only quickly generate and modify product models, but also accurately control the distribution and effect of colours in three-dimensional space, helping designers intuitively feel the expression of colours under different materials and lighting conditions, and thus more accurately grasp the emotional experience brought by colours. This concept provides valuable insights for the MEPCD system. On the basis of the existing MEPCD system, we can further utilize GT to refine the evaluation model of multi-dimensional emotional product colour images, making it more accurate in reflecting users' emotional needs. In product colour design, we can also draw on the experience of exhibition hall layout to convey the brand concept, product characteristics, and the lifestyle or emotional value pursued by target users through colour. Meanwhile, the optimization algorithm of NSGA-III can be further improved to better handle large-scale, high-dimensional colour design schemes, ensuring that while pursuing emotional resonance, it also meets other constraints such as product practicality and cost-effectiveness.

2 DEVELOPMENT STATUS OF BIG DATA ANALYSIS TECHNOLOGY AND CAD TECHNOLOGY

Exhibition hall layout is a complex and comprehensive activity. Exhibition designers should be good at using different colours, fully utilizing the coordination of colours to present the environmental atmosphere of the exhibition and enhance its attractiveness. Generally speaking, colour matching and design can be divided into various colour design patterns, such as the same colour, similar colour, and complementary colour. It involves a large amount of data and information, and Wang et al. [11] not only need to combine the theme of the exhibition hall, but also take into account the emotional changes of the audience, fully reflecting the design intention of the exhibition hall. Therefore, in order to create an atmosphere for the exhibition hall, we should start from the perspective of data technology and use big data and computer-aided technology in the exhibition hall layout process to improve the implementation effect of the exhibition hall layout. The intelligent analysis and data mining of big data technology can extract potential information value from data and help people make correct decisions. Big data technology has been applied earlier in foreign countries with relatively successful application cases. Wu et al. [12] used big data to analyze consumers' shopping data, understand their behaviour and preferences, and then re-match the product structure of shopping malls. In China, the application of big data technology to handle related issues is still in the development stage. More and more big data analysis is being added to different industries. Big data itself also has different structural characteristics. There are three modes for collecting and storing different types of data: structured, semi-structured, and unstructured. Not all collected data is suitable for application or has a certain value. Therefore, data processing is very important as it can remove and eliminate noise and interference from the data, ensuring its validity.

Computer-aided technology, as a graphics processing and data storage tool based on computer systems, has been widely applied in fields such as industrial design, engineering manufacturing, and architectural design. When analyzing computer-aided technology, Xu [13] found that the United States applies computer-aided technology to animation processing. They analyzed the traditional 2D animation interface and transformed it into 3D dynamic effects through parameter adjustment using computer-aided technology, thus achieving the transformation and innovation of animation products. In addition, computer-aided technology is also very important in industrial design. From the physical characteristics of the product to colour design, evaluation, and generation, everything can be done in computer-aided models. It can not only determine product

functions but also adjust data parameters at any time, continuously optimizing the final production effect of the product during the design process. From a design perspective, computer-aided technology can improve the speed of generating design drawings, shorten the design cycle in colouring, modification, comparison, and other aspects, and accelerate communication and collaboration among designers in their work. It can not only meet the design needs of ordinary users but also satisfy the innovative thinking of designers. Zhang et al. [14] used their own visual modelling and 3D modelling to help designers generate more aesthetically pleasing design drawings. In summary, big data analysis and CAD technology have been widely applied in many fields and have achieved certain results. We will also use them for emotional colour-matching research in the exhibition hall layout.

In terms of exhibition hall layout and emotional colour matching, some scholars have conducted an in-depth integration of aesthetic experience theory. Meanwhile, considering the impact of different observation angles on colour perception, we use expert questionnaires and big data analysis to determine the optimal colour combination and observation angle, ensuring that the product can exhibit the best aesthetic effect in different scenarios. This user-centred design approach ensures that products not only have visual aesthetics but also can touch users' emotions and establish deep emotional connections. During the colour-matching design phase, Zhang and Deng [15] drew inspiration from strategies such as creating an atmosphere and guiding the visual flow of the exhibition hall layout. By carefully selecting and matching colours, we have created a unique emotional atmosphere for our products. By analyzing users' emotional responses to different shapes and colour combinations through big data, we can more accurately grasp the aesthetic preferences and emotional needs of target users. The successful practice of emotional colour matching in the exhibition hall layout has provided us with valuable inspiration. These formulas are based on big data analysis and aesthetic experience theory, and can objectively reflect users' acceptance and love for design. In order to verify the effectiveness of the design model, some scholars use quantitative aesthetic measurement formulas to evaluate the aesthetic value of different shapes and colour combinations. The study using fresh food trucks and bladeless fans as examples shows that the quantitative formula is highly consistent with the results of expert questionnaires, further confirming the reliability and practicality of the design model. At the same time, subjective verification is conducted through expert questionnaires to ensure that the design results meet quantitative standards and are recognized by professionals.

3 ANALYSIS AND RESEARCH ON THE EMOTIONAL COLOUR MATCHING OF EXHIBITION HALL LAYOUT BASED ON THE THEORY OF AESTHETIC EXPERIENCE OF CAD AND BIG DATA ANALYSIS TECHNOLOGY

3.1 Emotional Analysis of Exhibition Hall Layout Based on Big Data Analysis Technology and Its Impact on Research

In recent years, many areas have committed to holding small or medium-sized exhibition halls. When explaining the exhibition content, small-scale exhibition halls should fully highlight the theme and present new exhibition characteristics and spatial characteristics for the audience. Among them, colour design has become indispensable and important content. People are more resistant to dark colours, grey and black colours, and they will feel that the exhibition is full of pressure and seriousness. And the warm colours of orange, yellow, and pink can make people feel a warm, comfortable atmosphere. So far, colour has been a problem in the field of design, color matching is the coordination of two or more colours, and harmonious organization together. Whether through the harmonic relationship of color, or the essence of aesthetic experience. The purpose of the design is to try to use various combinations of the colour itself to improve the comfort of the space. Humans have been aware of colour for tens of thousands of years, but the subject of colour design is limited. We use big data analysis technology to extract the content about colour matching from the literature review over the years and learn that colour design has been based on the three basic colour light theories. After the theory of green, red, yellow and blue

four-element colours was put forward, it was combined with psychology and physics to form the colour discipline gradually. It can be seen that the discipline of colour design provides us with a high-quality colour environment that keeps pace with The Times, and gradually forms a special ideological system through the integration of art and technology.

Data analysis technology plays a significant role in the colour matching of the exhibition hall. Feedback from the public on the process of visiting the pavilion will be reflected in the form of data and information. In particular, the personal emotional characteristics of the masses are obvious, and different emotions have different preferences for colours, which seriously affects the design direction of designers. The intervention of big data technology can improve the designer's capturing effect of exhibition hall layout and mass emotion, and provide a reference for colour-matching design on this basis. Emotional analysis, also known as emotion-oriented analysis and emotion mining, uses big data analysis technology to identify various forms of emotional data, such as text, images and voice, and extract the key content. We use big data analysis technology to build a visitor emotional analysis framework related to exhibition layout, as shown in Figure 1:

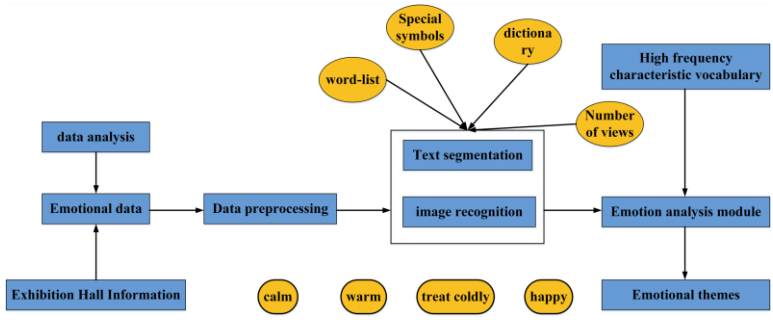

Figure 1: Visitor emotional analysis framework.

As can be seen from Figure 1, in the sentiment analysis framework, big data analysis technology is first used to preprocess and process relevant data in real-time. Through text segmentation and image recognition, high-frequency feature words are extracted and added to the emotion analysis module, and then the information related to the emotionalization of the exhibition hall layout in the emotion analysis module is identified to judge the emotional changes of the masses on different exhibition hall layouts. At the same time, in the database, according to the emotion dictionary and thesaurus, special symbols, and the characteristics of the browsing times of the masses, the accuracy of emotion analysis is improved. The data analysis formula is used to represent the relevant information in matrix form and concatenate it in the word vector. First, each word in the text is mapped to a fixed length, and then the word analysis model is used to concatenate; the formula is as follows:

$$X = \begin{bmatrix} x_1, x_2, \ldots, x_n \\ x_0, x_1, \ldots, x_{n-1} \end{bmatrix} \tag{1}$$

In the formula, Represents text length, n Represents the dimension of each word. Extract the local features of the emotionalized text and calculate the activation function of these feature data:

$$C_i = f(w \bullet x + b) \tag{2}$$

$$y = g(w_p + b) \tag{3}$$

In the application of characteristic functions, the mapping results of each vector are different. In order to ensure the accuracy of the emotional analysis, we also need to add weight parameters:

$$X = d_1 x_i + d_2 x_i + \ldots w_n x_i \tag{4}$$

Since big data analytics automatically masks some repetitive data when dealing with it, we need to compute data representations deeply:

$$h = (1 - z_t) \odot h - 1 + z_t h_t \tag{5}$$

Input the emotional analysis results output from the above formula into the emotional colour design process under big data technology, as shown in Figure 2.

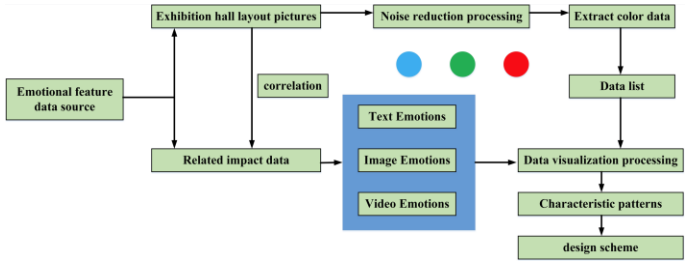

Figure 2: Emotional colour design process under big data technology.

As can be seen from Figure 2, the data source is the emotionalized feature generated by the calculation. Through the noise reduction processing of exhibition pictures in the exhibition hall, high-quality pictures are obtained, colour data is extracted and added to the data list, and the visualization of data is completed by combining with relevant influencing factors. According to the characteristics of the data, the final colour design scheme of the exhibition is formed. Noise reduction of pictures can reflect the emotional behaviour of visitors. The collected data information is unified in the model to pave the way for the later colour analysis. The picture background colour related to the exhibition hall will occupy a large area, which does not meet the research needs and will interfere with the later colour extraction. Therefore, we need to remove the repetitive background colour and simplify the feature points in the data. We show the detailed process of image noise reduction and colour extraction data processing, as shown in Figure 3:

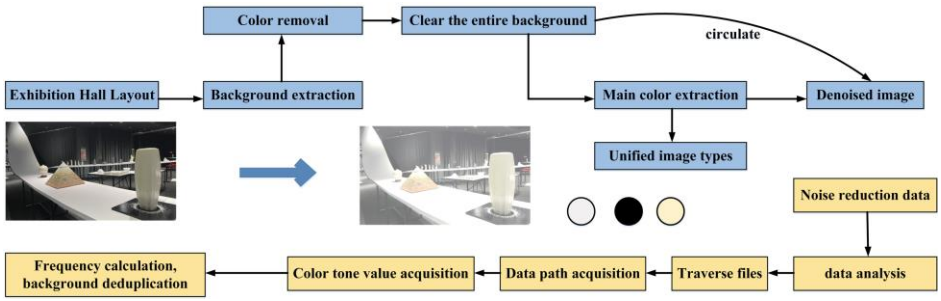

Figure 3: Detailed process of noise reduction and colour extraction data processing.

As can be seen from Figure 3, background colours in different types of exhibition hall layout drawings are extracted and removed. According to the emotional needs of the visitors, the main colour is collected. After the noise reduction is completed, it is added to the convenient file to obtain the colour value, count the colour types and times, and complete the work of reworking.

3.2 Research on the Emotional Colour-Matching Design of Exhibition Hall Layout Based on CAD Technology

Colour is an objective existence, which is produced by the visual effect of external light entering the eye. Visual features include hue, lightness, purity and many other elements. With the

continuous improvement of people's aesthetics, the requirements for exhibition hall layout are more complex. Under the aesthetic experience theory, improving the colour collocation of the exhibition hall layout is an important factor in attracting visitors. Colour in the design of the exhibition hall can make the exhibition theme look more coordinated, and through different colour matching, the softness and characteristics of the display items can be fully highlighted. In addition, the surrounding environment also has a certain impact on colour, such as the refraction of light, which will enhance the brightness and background colour of the colour. The use of different colours in the environment will allow visitors to feel different psychological changes in the centre of the pavilion, showing the gorgeous pavilion environment, generally using gold. For romantic pavilion themes, pink or red is usually used. We extracted most of the colour elements used in different exhibition hall themes and colour matching and judged the relevant atmosphere characteristics. The statistical table is as follows.

Exhibition Theme		*Colour*	*Atmosphere*
Smart Theme	1	Blue, white	immerse
	2	Blue, grey	immerse
	3	White, grey	immerse
Art Theme	1	Red, pink	happy
	2	Pink, yellow, green	immerse
Technology Theme	1	White, black	dream
	2	White, black	immerse
	3	White, blue	dream
Natural theme	1	Yellow, green	comfort
	2	Yellow, green, orange	peace

Table 1: Statistics on different exhibition hall themes and colour usage.

As can be seen from Table 1, in the theme of the exhibition hall, we have counted the contents of several exhibition halls, such as wisdom theme, art theme, science and technology theme, and nature theme. Most of the colours used in the wisdom theme are blue and white. Most of the art themes are red, pink, yellow, green and other primary colours. The technology theme is mainly white, black and blue. The natural theme is yellow and green, and it gives people a feeling of comfort and peace in the atmosphere of the pavilion. Due to the diversity of visitors' emotional changes, has an important influence on the adjustment of designers' colour matching. We use CAD technology to generate an emotional color-matching design system. Moreover, the application times of CAD technology at home and abroad in the colour design of exhibition halls were analyzed and counted. In recent years, with the gradual maturity of CAD technology, China has also applied it in the design of exhibition halls, and the number of applications has a significant increasing trend. Since it is difficult for the human eye to distinguish colours, if you want to subdivide their differences, you need to use CAD computer-aided models to generate data parameters and visualize colour mixing and feature distribution in the design system. Color is not a simple physical quantity, and visually it cannot be measured by quantity. We used a computer-aided model to display the brightness sequence, chrominance sequence, and Munsell hue ring of colors, as shown in Figure 4.

As can be seen from Figure 4, colour changes from low to high in the brightness sequence and chrominance sequence. The degree of perception in people's eyes changes. Munsell hue ring is the standard colour number for reference in the current colour-matching design. It can classify and name colours and can be matched according to certain rules in colour design. The normal use of the colour correlation coefficient is a complex process of quantitative evaluation.

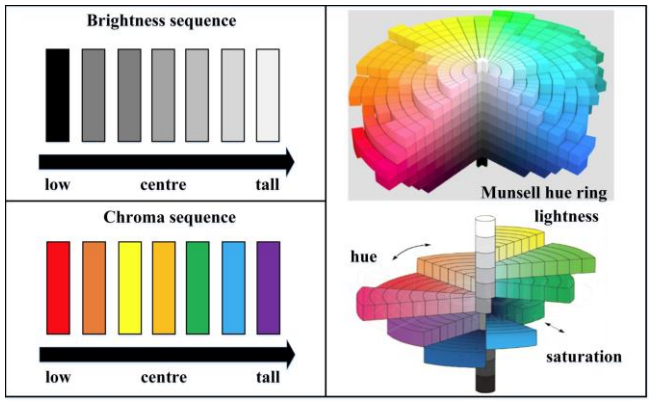

Figure 4: Brightness sequence, chroma sequence, and Munsell hue cycle.

Before using CAD technology to generate emotional colour matching, we need to calculate the degree of relationship between the same colours, using spatial coordinate distance to express the calculation formula as follows:

$$D = \sqrt{(V_g - V_i) + (V_g - V_s)}^2 \tag{6}$$

$$C_{rgb} = 1 - \frac{D}{255\sqrt{3}} \tag{7}$$

In the formula, V_g Table similar colour value data in colour matching. Due to the numerical particularity of white and black colours, we separately calculate the distance between them:

$$C_k = 1 - \sqrt{(v - v) + bmp(x_i - y_i)_2} \tag{8}$$

After similar colours are configured, the proportion of influence of each colour in the colour collocation is:

$$a = 1 - \frac{|\, p - p^1 \,|}{2} \tag{9}$$

$$p = \sum_{i=1}^{n} pAC_2 \tag{10}$$

Due to the high colour similarity, it is difficult to give the designer an intuitive impression, we also need to expand this gap according to the way of weighting in the CAD computer-aided system:

$$R(u) = (1 - u) + r \tag{11}$$

If the exhibition hall has special requirements for colour matching, we can also design the corresponding adaptation function for it to adjust the colour value in a small range:

$$R = t[r_1, r_2, r_3, r_4]u \in 255 \tag{12}$$

In order to avoid the efficiency of the auxiliary system due to the large-scale spatial search. Add corresponding constraints to optimize the calculation formula:

$$(X,Y) = (1 - v)[\max RGB]_2 \tag{13}$$

In the formula, (X,Y) for the allowable range of variation. Because the interior space of the exhibition hall is not flat and regular, we also need to take into account the influence of space factors when carrying out nonlinear surface colour design. Using the objective function to construct the colour coefficient of the surface space:

$$\Delta A(v) = RGB(x-y)(z+m)_0 \tag{14}$$

$$C = D + (u,v)_{x,y} \tag{15}$$

By adding constraint conditions to irregular space, the process of colour scheme generation is optimized. The colour-matching design of the exhibition hall can give people a feeling of beauty and also affect people's psychological activities from the aspect of colour. Use direct visual stimulation to associate, and unconsciously influence people's emotions. In turn, the emotional needs of visitors will also affect the formation of colour-matching design schemes.

4 BASED ON THE AESTHETIC EXPERIENCE THEORY OF CAD AND BIG DATA ANALYSIS TECHNOLOGY ON THE EXHIBITION OF EMOTIONAL COLOUR-MATCHING RESEARCH RESULTS

4.1 The Emotionalization of the Exhibition Hall Layout Based on Big Data Analysis Technology and the Analysis of Its Impact on Research Results

For the exhibition hall layout, designers should recognize the internal connection between the inner emotions of the visitors and the colour, and optimize the colour-matching design goals according to the emotional changes. All kinds of colours have potential psychological implications effect and represent certain emotional tendencies. On this basis, if we want to break through the conventional venue layout and ensure the novelty of the exhibition's creativity, we must start with colour matching. In this paper, big data analysis technology is used to extract keywords from visitors' emotional changes in the exhibition hall. Through the way of controllable display and analysis, we can judge the impact of changes in mass emotions on the collocation design of the exhibition hall. The emotional information of visitors under the construction of big data analysis can be viewed as follows.

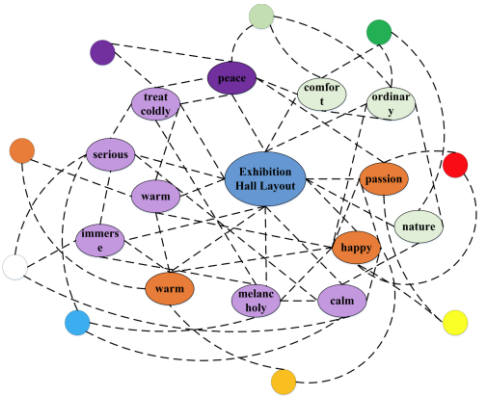

Figure 5: Visual representation of emotional information of visitors under big data analysis.

As can be seen from Figure 5, in the view of emotional information, the exhibition hall is arranged as the centre of the vocabulary, surrounded by a variety of visitors' emotional characteristics, such as calm, warmth, passion, enthusiasm and indifference. The outermost part is the colour elements of the exhibition hall. Through the connection between emotional features and colour elements, we find that warm emotional features are closely connected with yellow, red and orange elements, while white and blue, which represent apathy, are also connected with emotional features such as calm and tranquillity. In order to verify the effectiveness of big data analysis technology, we compared the traditional exhibition hall exhibition visitors' emotional coefficient capture method, and tested the accuracy, as shown in Figure 6.

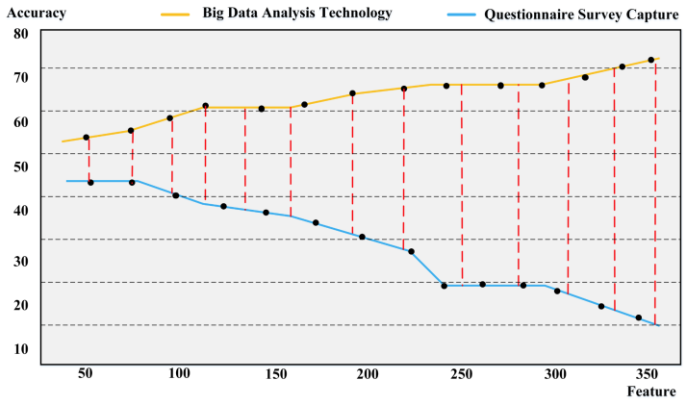

Figure 6: Comparison of capture accuracy of big data technology.

As can be seen from Figure 6, the traditional way of capturing the emotion coefficient is carried out in the form of a questionnaire survey, and the accuracy of this questionnaire method decreases significantly when faced with dynamic data. The use of big data analysis technology to capture changes in visitors' emotions is more accurate.

4.2 Analysis of Research Results of the Emotional Colour-Matching Design of Exhibition Hall Layout Based on CAD technology

The ultimate purpose of colour use is emotional transmission, and the colour design itself contains emotional characteristics. Emotional colour matching refers to the induction effect between people and colour design. In the exhibition layout activities of the exhibition hall, in order to enable the masses to bring some psychological experience under the direct stimulation of colour, designers need to combine emotional needs to generate corresponding colour-matching schemes. We use CAD technology to analyze the emotional colour-matching schemes of the exhibition layout of the venue based on big data. Perform automatic generation optimization. First of all, the 3D visual exhibition hall colour distribution map constructed by CAD technology is shown as follows.

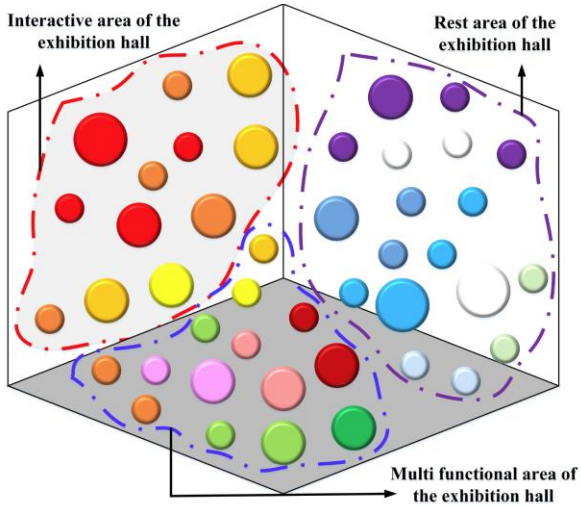

Figure 7: 3D visualization of exhibition hall colour distribution map constructed by CAD technology.

As can be seen from Figure 7, we used colour visualization to display the distribution of colour elements inside the exhibition hall in the CAD three-dimensional system. It can be seen that the venue area is divided into different emotional characteristics, corresponding to the use of similar colours. The interactive areas of the exhibition hall use warm colours such as yellow and red, while the rest areas use soothing colours such as white, blue and green. The construction of this visual three-dimensional is viewable and can make visitors who are not familiar with colour directly experience the effect of colour-matching design. Next, verify the efficiency of CAD technology in generating emotional color-matching design schemes, as shown in Figure 8.

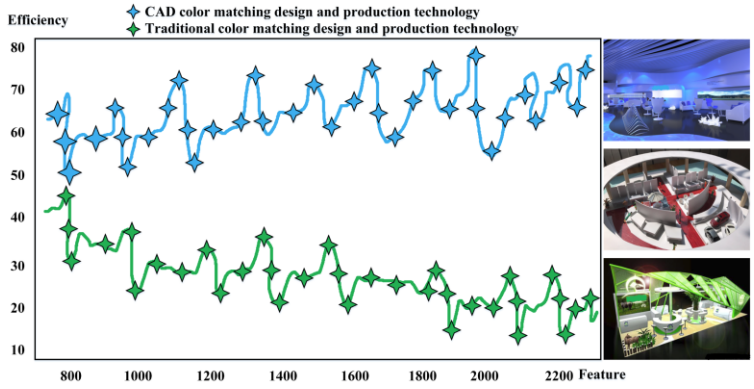

Figure 8: Efficiency comparison of CAD technology in generating emotional color-matching design schemes.

As can be seen from Figure 8, compared with traditional colour-matching design and production technology, CAD technology can still ensure the efficiency and speed of the generation scheme in the face of a large number of constraints of emotional features. To this end, we also show the renderings of the exhibition hall optimized by CAD technology in the data chart, and the interior space of the exhibition hall is richer in colour. It can be seen that the space atmosphere of the exhibition hall is mainly coordinated through colour design, and colour also plays a decisive role in the exhibition space. The flexible and accurate use of colour matching can make the interior space of the exhibition hall harmonious and unified. Change the simple layout status quo, and create a diversified exhibition theme that is more in line with people's needs. At the same time, the use of colour collocation can also improve the artistic and cultural communication power of the exhibition hall, refine the colour-related concepts in the theme works into the exhibition hall, better create the atmosphere of the exhibition hall, and let the masses obtain new cognition between the two-way interaction.

5 CONCLUSIONS

With the continuous progress of modern life, more and more exhibition halls have begun to develop in the direction of intelligence and diversification. Under the environment of aesthetic experience theory, colour matching in exhibition hall layout has become an important reason to affect visitors' stay time. In addition to considering the design of the space layout, the exhibition hall should also present a comprehensive artwork for the audience, and the colour-matching design is an important factor in highlighting the exhibition theme. On this basis, using CAD and big data analysis technology, this paper studies the emotional colour-matching design of an exhibition hall under the support of aesthetic experience theory. First of all, it analyzes the core connotation of aesthetic experience theory and analyzes the present situation of exhibition hall layout from the perspective of aesthetics and design. Big data analysis is used to extract the emotional changes of the exhibition hall and construct a viewable view of emotional information, so as to judge the

relationship between the emotional coefficient and the color matching design. Through information collection, information analysis and information processing of big data technology, the accuracy of emotion coefficient capture is optimized. Finally, with the help of CAD technology, the three-dimensional visualization exhibition space of the exhibition hall is constructed. Based on the colour elements, the colour distribution inside the optimized exhibition space of the exhibition hall is displayed, and the corresponding colour-matching design scheme is automatically generated under the emotional needs of visitors. The research results show that the CAD and big data analysis technology under the aesthetic experience theory have an important impact on the emotional colour-matching design of exhibition halls, which can not only improve the atmosphere of the interior space of exhibition halls but also highlight the theme and allow visitors to stay longer.

6 ACKNOWLEDGEMENT

The general project of research on education and teaching reform in higher education institutions in Hainan Province in 2022, titled "Research on the Application of Aesthetic Experience Theory in Innovation and Entrepreneurship Education for Vocational Undergraduate Students", No. Hnjg2022-124.

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