Development of APP Visual Design Under the Background of Big Data

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Abstract. With the wide application of big data analysis technology in all walks of life, this paper proposes the development of APP visual design based on the background of big data, focuses on the application of big data in visual design, studies the application of big data visual technology in information transmission, transforms system data into common icons, describes the current situation of big data storage technology, and studies the big data visual design. This paper analyzes the application of big data storage technology in the monitoring system, and puts forward the corresponding data security measures.

Keywords: Big data · Visual design · Teaching logic · Divergent thinking

1 Introduction

The arrival of the era of big data is impacting all walks of life, to a certain extent, it puts forward new requirements for the talent training of visual communication design major, but there are some serious problems in the traditional creative course of visual communication design. Domestic colleges and universities need to change the teaching and training mode, innovate teaching logic and teaching practice in order to cultivate talents to adapt to the development of the times and social needs, especially some Newly Upgraded Undergraduate Colleges and universities need to achieve positive transformation in teaching.

Visual design is a subjective form of expression and result of eye function. Compared with visual communication design, visual communication design is a part of visual design, which is mainly for the conveyed object, namely the audience, and lacks the demand for the designer's own visual demand factors. Visual communication is not only conveyed to visual audience but also to designer. Therefore, in-depth visual communication research has paid attention to all aspects of visual feeling, which is called visual design more appropriate.

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In the end, what is visual design? Nieh, who is involved in computer professional research, will answer your doubts [1]. Visual design is the expression means and results of the subjective form of eye function. Similarities and differences between visual communication design and visual communication design: visual communication design is a part of visual design, which is mainly aimed at the audience, and lacks the appeal of visual demand factors of designers. Visual communication is not only conveyed to the visual audience, but also to the designer himself. Therefore, in-depth research on visual communication has focused on all aspects of visual experience, which is called visual design more appropriate.

Based on the analysis of the design status of at the present stage, the main content of its visual communication design is still graphic design, which is commonly called "graphic design" by professionals. "Visual communication design" and "graphic design" contain no big difference in the design category at this stage, "visual communication design" and "graphic design" in the conceptual category of distinction and unity, there is no contradiction and opposition (see the Fig. 1).

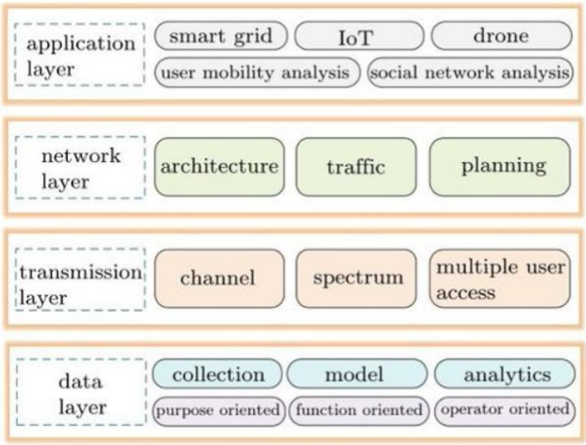

Fig. 1. Frame for big data

2 Big Data Analysis

2.1 Definition of Big Data Analysis

Big data analysis is the product of rethinking data science and exploring new models in a data intensive environment. Its core idea is to use a more effective way to manage massive data and extract value from massive data [2, 3]. It is the core of the concept and method of big data. It refers to the process of analyzing massive data with various types, rapid growth and real content, and finding information that is conducive to decision-making from the mass data.

2.2 Data Visualization

Data visualization is a technology originated from computer graphics. Its function is to directly display the implicit information in the data. According to the types of displayed data, we can divide the displayed data into composite data and non combined data. Therefore, the visualization of display data can also be divided into combined data visualization and non combined data visualization. According to the different data sources, we can divide the modern data visualization into two parts. The first part is generated by computer graphics processing, the other parts are generated by image processing technology, and then displayed in the form of interaction [4].

The purpose of data visualization is to convey and exchange information to the outside world, which is generally realized by means of graphics. However, this is not to say that data visualization will become tedious because of its function, or extremely complicated because of its colorful appearance. How to effectively convey ideas and concepts, this is the difficulty of technology. In order to solve this problem, we need to develop aesthetic form and function simultaneously, so as to realize effective communication. Complex data sets are difficult to observe. This problem can be solved by data visualization. The method to realize this problem is to intuitively convey the key aspects and characteristics of data.

2.3 Big Data Storage Technology

With the continuous development of centralized monitoring system, the types and quantity of signal equipment monitored by the monitoring system are more and more. Coupled with the characteristics of real-time monitoring of the monitoring system, the amount of data collected is very large, which poses a great challenge to the system storage. Therefore, the system puts forward higher requirements for data storage, It is necessary to strengthen the system data storage function to meet the storage demand of the rapid growth of data (see the Fig. 2).

At present, the transportation equipment management system stores a lot of information related to the technical status of the equipment [5–7]. They store a lot of relevant data through the traditional data storage method. However, due to the independent construction and application of each professional system, there is a lack of unified data storage method between them, so there are great difficulties in data sharing and comprehensive application. With the vigorous development of big data technology, the data collected by professional transportation equipment management system is becoming more and more diversified and massive. At present, the integrated transportation equipment management system has been built and put into use, accumulating the amount of data up to Pb level. Analyzing the data types, most of the data types are semi-structured or unstructured, and are growing rapidly. It can be seen that in the face of the explosive growth of massive data, the traditional storage management technology has been unable to meet the growth needs of massive data processing, calculation and analysis as well as comprehensive application.

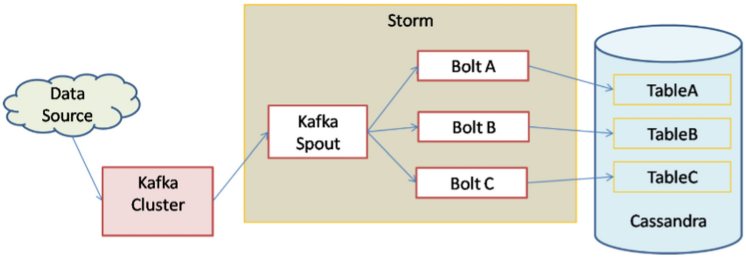

Fig. 2. Big data storage technology

3 System Function Realization Based on Big Data Mining

3.1 Time Series Mining Algorithm

There are many factors to determine the sample length, which are affected by many factors, among which the energy leakage effect of field signal and the resolution of different frequency harmonics play a decisive role. Because we can't analyze the infinite length sample, we can only intercept the limited part of the sample to analyze. According to the general rule, the sample length of the sampling value with complete operation time stage is the whole operation time stage of the equipment being monitored [8].

The calculation method of distribution density is to take V continuous segments from I to j, and then calculate the distribution density of effective data distributed on them. See Formula 1.

$$\rho_{ij} = \frac{\sum_{p=1}^{j} N_P}{\sum_{p=i}^{p=j} 1_{mp}} (i = j - v, 0 < j \leq m - v) \tag{1}$$

Where l_{mp} the length of the line m_p;

Calculation of estimated normal value:

The estimated normal value is obtained by calculating the effective sampling values in the interval with the largest linear density distribution.

The estimated normal value R_0 is shown in Eq. 2

$$R_0 = \frac{1}{m}(\sum_{i=i_0}^{i_0+v} \sum_{i} rs) \tag{2}$$

In the formula, m refers to the value of effective sampling points in the interval corresponding to the maximum linear density. It refers to not only the values of individual points, but also the values of all effective sampling points.

This paper briefly introduces the above-mentioned processing process, including the following three steps: the first is grouping, grouping the collected data by equipment, the second is preprocessing, and the third is comparative analysis. When the equipment is in normal state, the equal interval sampling curve is basically similar, and the collected data are compared and analyzed, Only the data distributed within the error range are valid values.

Because of equal interval sampling, so the sampling time is equal, then the change trend can be determined by the increment of R. That is, $K_{ij-ij+1}$ and K_{0j-j+1} are the same sign

$$K_{ij-ij+1} \times K_{0j-j+1} \geq 0 \tag{3}$$

It can be transformed into the following formula, as shown in formula 4:

$$(R_{ij} - R_{ij+1}) \times (R_{0j} - R_{0j+1}) \geq 0 \tag{4}$$

When one of them is 0, further determination is made according to the relative increment of amplitude.

4 Construction of Narrative Strategy Model in Visual Communication Design and Simulation

Visual communication design narrative is a narrative type different from the traditional language and literature narrative. It is very different from the traditional language and literature narrative in terms of historical development, narrative media, narrative perspective and space-time structure. After a thorough study of narrative theory, it is the focus of this paper to propose a complete and feasible narrative strategy [9]. Starting from the current development and problems of visual communication design and narratology, this chapter analyzes the internal and external factors involved in narrative text, and attempts to establish a feasible narrative strategy model is the focus of this chapter. Firstly, it analyzes the theme, media and discourse of narration from the inside of the narrative text. Secondly, it systematically studies the narrative of visual communication design from the external factors of the text, such as the influencing factors, evaluation indexes, objectives and tasks, and communication methods, so as to establish a set of universal and operable narrative design strategies, In order to provide some reference and guidance for the design narrative practice.

The construction of strategic model is a systematic project, and its influencing factors are an important research level that can not be ignored [10]. It is more conducive to the complete establishment of the strategic model to systematically sort out the relevant influencing factors before constructing the strategy model. The narrative of visual communication design is a qualitative research. The research on its influencing factors is different from the quantitative research, so it needs specific analysis. First of all, we need to analyze the relevant characteristics of visual communication design narrative in the communication process with the help of communication theory, and then summarize its influencing factors. (see Fig. 3) Secondly, on the basis of communication theory, combined with the specific text construction content of design narrative, this paper studies the relevant influencing factors of its existence, so as to provide support for the establishment of narrative strategy model.

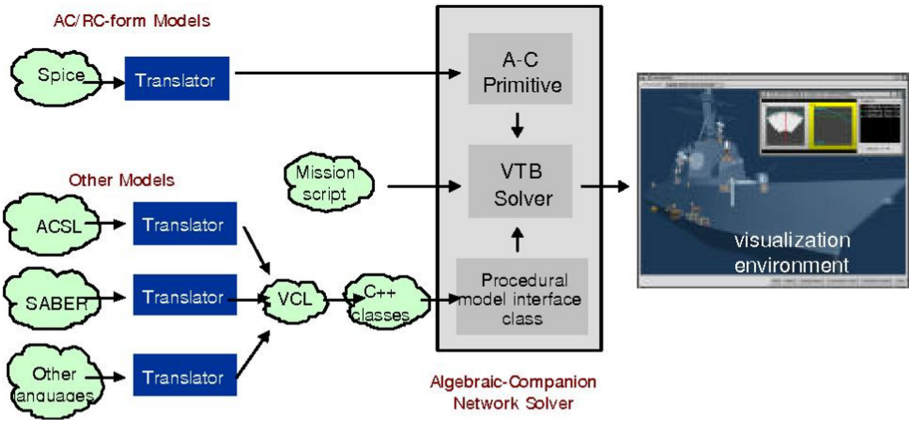

Fig. 3. Visual simulation model.

5 The Double Attribute of Character Symbol

As a process of expressing people's cognition and thinking, it has the function of expressing semantics and is a very important visual symbol system. With thousands of years of history, it presents two important functions of ideography and phonology, and finally integrates form, image and meaning. The final discourse relationship is highly abstract. Combining the phonetic function of language, it can achieve the function of language expression well [11–14]. At the same time, due to the expression of the form of words, it also has the aesthetic function of expressing the meaning through graphics, which is the problem of its graphic meaning and discourse system mode.

5.1 Linguistic Symbolic Content

It is self-evident that what kind of speech happens in today's media, and the importance of words in it is to achieve the transmission of the meaning of words in a way of carrying. Saussure, a Swiss linguist, once said that words and speech are the two main components of language, which have to go through historical evolution [15]. The language system used by people from generation to generation is what people say, which involves many factors such as words and grammar, among which some standards and norms have been established. Language is an important form for individuals to express what they feel and think in society. Language itself needs to be presented through words and words. The essential difference between auspicious language and characters lies in the visual form of reading. However, due to the influence and function of pronunciation and meaning, the function of speech is an important way to express vision and convey the core connotation of design. At the same time, it also has the function of assisting and supplementing the image system. Even if this form of expression of graphic meaning has the image and decoration, it also needs to be carried out on the basis of the combination of language and words.

5.2 Visual Symbol Form

Because characters have their special visual symbol form, they can be expressed by visual carrier, which requires people to understand the rules of characters and technology. In the visual design, the symbolic text expresses its content perfectly through its presentation form, and the text also has a perfect interpretation of the graphics. Man is a kind of visual animal. With the help of its unique form of expression, words can make people produce specific emotions [16]. The image of words and the expression of its meaning are two inseparable parts. From the perspective of semiotics, that is to say, the meaning of symbols and the expression of symbols are two interdependent attributes. If a symbol or character can't express its emotion and meaning perfectly, it has no soul, no culture and can't influence people's positive energy, and the character is just an empty body; similarly, if it only has soul, no external form, the soul has no place to place, and can't attract people's attention in form, Only with boring content is not perfect text form.

6 "Language" Art of Visual Communication

Text has its unique way of expression, so the value of visual communication design can not be replaced. Text can mark the graphics through its language expression ability, and also can complement the visual graphics. This complementary creative way provides more innovation space and more possibilities for the creators.

6.1 Graphics of Characters

Through the structure of the whole system of characters and the embodiment of various shapes, the graphitization of characters can be reflected, which includes seal cutting, printing, writing, technology and other forms. There are two aspects to the graphic trend of Chinese characters. The first is that the rules of creating Chinese characters in our country can reflect the image meaning of Chinese characters [17, 18]. From the Chinese character symbol system, it can be concluded that for some European and American countries, their early development tends to phonetic notation, which is difficult to contact with the relevant historical origins, The value of Chinese character form can be traced back to the source of historical development. Through the simulation of various natural objects, it can reflect the establishment mode and logic of the overall structure of Chinese characters. Nowadays, Chinese characters present a relatively simple way of expression, with a certain degree of cognition. With the transformation from anti lock to simple mode, the typical characteristics of Chinese characters have been preserved, and even the expressions related to logic and pictophonetic escape have appeared. This is also an important form of visual creative expression of characters. The decoration and visualization design of characters eventually promote the development of characters in the direction of graphics, and the constituent elements mainly include image elements, decorative patterns and characters. With the help of decorative images, the image has stronger appeal and embodiment. In addition, through the expression of traditional Chinese characters, it is not confined by decorative pictures and images. In the category of "diagram", it also includes the overall arrangement of diagrams, charts and pictures,

sometimes even completely composed of words [19]. This is not only in line with the concept of today's schema, but also reflects the distinction between graphic recognition, graphic theory and graphics. The final visual effect is more prickly, and also has the expressive power of the superposition of graphic information.

6.2 Creating the Schema of "Meaning"

Creativity, as we often say, does not only refer to the innovation on the surface, but also the expression of new concepts in visual design. It is a visual expression method with new significance. In general, the meaning of text design is often reflected in the combination of text and pictures, which also shows the complementary situation of text and pictures. Words and pictures are inseparable, and also an important part of the combination of noumenon and metaphor [20–23]. As shown in Fig. 4. The combination of words and pictures is based on pictures and assisted by words, which has the largest proportion in the design. The text only plays a certain auxiliary role in the design of the picture, including the content of the title and accompanying text. The text of the title is often innovative, and it will also express the meaning of the title to a certain extent.

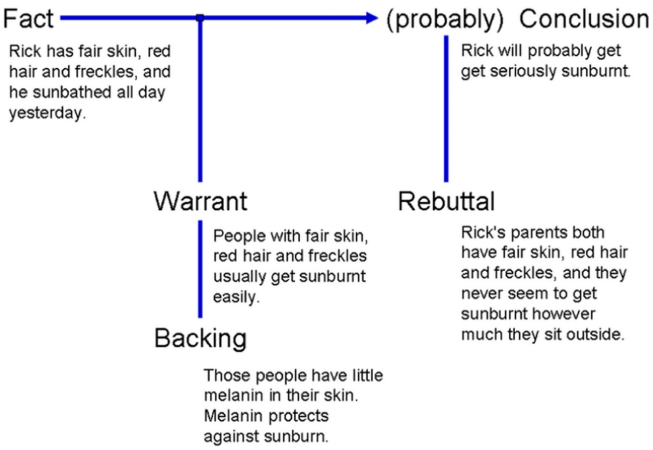

Fig. 4. The schema of creating "meaning".

7 Conclusion

Visual communication design narrative is an important part of contemporary visual narrative. It is different from classical narratology in terms of narrative media, choice of narrative perspective, and temporal and spatial structure of narrative. Its narrative research is also constantly absorbing the research results of other disciplines, gradually expanding the expression form and communication mode of narrative, and with the progress of social science and technology, it is still in the process of continuous development. As a member of modern visual narrative, visual communication design

narrative has almost all the characteristics of modern visual narrative, and is an open narrative category. It always meets new technology and new ideological trend with an open attitude, and constantly changes and develops the narrative form and expression form.

The evolution of human history is closely related to the evolution of human history. However, in the process of its development, with the continuous change of narrative media, the narrative form has undergone great changes, which has played a different impact on people's lives in different periods. In the primitive period, visual narrative is an important means of communication for human life [24]. With the emergence of characters, the shortcoming of insufficient linear time of visual narrative is magnified and gradually replaced by language narrative with linear characteristics. Language narrative began to become the mainstream of narrative, and visual narrative gradually changed from the mass narrative behavior in the primitive period to the artistic behavior of the minority. With the development of mechanical reproduction technology and the maturity of photography and film technology, visual narrative began to revive in an all-round way, and became the mainstream of the times, setting off a new wave of visual culture.

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