Research on FUI Style Design of Big Data Information Visualization*

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Abstract. The purpose of the article is as follows, studying the FUI style of the interface for big data information visualization design among various styles of visualization interface in the 21st century. There are three research methods in this paper. Firstly, combining the concept of FUI and summarizing the design features of FUI style interface of big data information visualization from the perspective of design psychology. Secondly, the characteristics of government business big data information visualization and the needs of users are analyzed. Finally, the FUI design style is used in the government business big data information visualization display interface design. The FUI style presentation mode of big data information visualization and the dynamic interaction mode of FUI style interface are discussed. The conclusion is as follows, FUI is more in line with the people's psychological expectation of "future technology visual style" in big data information visualization display, highlighting the FUI data display focus on the prediction function of future events; FUI achieves visual balance through reasonable typesetting, comfortable color matching, uniform decorative shapes, etc. In terms of visual display, it not only meets the requirements of data display design, but also achieves the visual unity of partial data display design and overall data display. FUI mostly adopts flat design and simple dynamic interaction design, which conforms to users' gesture operation and people's visual browsing behavior habits in the era of mobile Internet, and meanwhile improves the utilization rate of single screen display of government departments.

1 Introduction

With the rapid development of computer, Internet and Internet of things technology, the massive information generated by a large number of users is transmitted and recorded, creating the era of information explosion. The massive data contains the laws and development trends needed by professionals from all walks of life. How to use the useful information in massive information has become a challenge and opportunity for enterprises. Information visualization is to show the internal structure, association and pattern behind the complex data, which can help people make better use of the massive information generated by users. Some researchers believe that the three major development directions of information visualization are cross media, big data era and social network¹, and we are in the stage of information visualization in the era of big data. The research on the FUI style of government big data information visualization will improve the efficiency of government departments in processing massive information, and enrich the theoretical knowledge in the research field of government big data information visualization display style on large screen.

2 FUI Overview

2.1 Basic meaning

The FUI interface is also called fantasy user interfaces, fictional user interfaces, fake user interfaces, futuristic user interfaces and film user interfaces. The three letters "F", "U" and "I" have more meanings. The main reason is that this kind of interface style comes from sci-fi films and TV works of designers at home and abroad, as shown in Figure 1. With the continuous development of domestic interface design industry, the idea of "cross-border integration design" is worth learning and learning. Designers in big data information visualization industry usually learn from this style to realize interface design with a sense of future high-tech. the FUI style of big data information visualization is born from this.

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Fig.1 FUI interface design in science fiction movie

2.2 The history of FUI

FUI has been developed both at home and abroad, and its source can be traced back to the user interface design in science fiction movies. According to Yang Kun's research on interface in science fiction movies², we can get the development diagram of FUI interface design, as shown in Figure 2.

Fig.2 Development diagram of FUI interface design

As can be seen from the above figure, the interface design style of big data visualization was influenced by American science fiction films and TV works from the beginning of the 20th century to the beginning of the 21st century. People's yearning and perception of the future world also gradually understand the appearance of the future city and the future world through these emerging virtual interfaces. It is this sense of freshness and strangeness that leads to the big data industry related visual large screen design in the big data industry with great predictability in the future.

2.3 Overview of design elements from the perspective of FUI psychology

Design psychology is an interdisciplinary subject of design and psychology. It is a science that studies the psychological phenomena of design subjects and design target subjects (consumers or users) in the field of design, as well as the relevant factors affecting psychological phenomena³. The current research problems (AIMS) of design psychology can be divided into three categories according to description, explanation and prediction. It describes the psychological state and process of the two main bodies in design related behavior: consumer / user and designer; explains the interaction behavior and process between the subject and the design object, usually on the basis of description, explores the causal relationship behind the phenomenon; predicts the demand of the subject and future changes. According to the description and interpretation of the current situation, the possible changes of the main body and design object after a certain time or condition change are predicted [4]. According to the FUI style of government big data information visualization, the problems encountered in the FUI of big data information visualization are listed according to the relevant theories of design psychology, as shown in Table 1.

Tab.1 Analysis of FUI design problems

No.	Research purpose (question)	Research type	Research level
1	Does a small amount of bold text enhance the reading experience of large screen information visualization	Design element evaluation and subjective experience	descriptive
2	Does the event prediction big data information visualization adopt the FUI style	Research on user requirements	descriptive
3	Do government officials like flat digital screen display	Research on user requirements	descriptive
4	Study on the factors influencing the preference of speech information and gesture information in large screen visualization	Interactive experience	Explanatory
5	Comparative study on interactive experience of big data information visualization contactless gesture control and touch screen control	Development trend of human computer interaction	Predictability

Future technology elements are the visual elements of the FUI style, which are usually composed of special-shaped graphics. The special-shaped pattern is formed by

the combination, segmentation and deformation of the common shapes such as circles, rectangles and triangles. Future technology elements are generally composed of

some elements on mecha equipment such as repeated points, hard broken lines and irregular surfaces, which visually build a sense of strangeness that users have never seen before. The sense of distance generated by strangeness will make users feel that they are far away from their own lives, and finally realize the sense of vision of future technology. The main purpose of the FUI style is to show the development of science and technology in movies or games. The development of science and technology is inseparable from the brain of human intelligence. In the process of building a smart city, we use "wisdom" and "technology" to highlight human beings, and use the FUI style to convey the high-tech sense of "government affairs big data information visualization", as shown in Figure 3.

Fig.3 2020 Baidu cloud Intelligence Summit (Live Baidu)

3 Government big data information visualization

The big data information visualization display interface is based on the development of big data related technologies. The processing process of big data mainly includes: data collection, data analysis and data presentation; the key of big data information visualization display interface is data presentation. The main way of data presentation is data visualization⁵. Data visualization is to output the analysis results of big data in readable and visible forms, so as to facilitate users to obtain relevant information effectively. The data visualization of the big data information display interface displays the big data information in the interface through the design elements such as menu, button, text, icon, picture, and realizes the interaction with it, so as to help implement the user's target task⁶. With the rapid development of big data cloud technology, 5g era is coming. As a branch of big data information visualization, government big data information visualization gradually occupies a certain demand in the market, and the similar

visualization products in the market are becoming more and more homogeneous; the younger government staff, the aesthetic of visual display projects is constantly improved; in order to promote the construction and development of smart city, it is also inseparable from big data in urban development Processing and information visualization. The visualization of government big data information is generally for the relevant personnel of the government's internal functional departments to view, such as looking at the road sections prone to traffic congestion in the city, recommending the best travel route of citizens through official channels; in the forest fire prevention work, real-time monitoring of the flammable places of forest fire; checking whether the economic indicators of various regions under the jurisdiction of the city are up to standard, and quickly check the urban economy Build the top list and so on.

4 Government big data information visualization FUI

4.1 Government big data information visualization FUI

Compared with the interface style in sci-fi movies and TV works, the FUI style of government big data visualization interface is concise, mainly focusing on business functions, with decorative elements around the screen and short thick lines as the basic elements. The purpose of the short line is to make it easy to implement the programming language, shorten the number of code, and reduce the space volume of the whole system. Finally, the auxiliary program can quickly render the visualization effect on the large screen. For real-time rendering data, highlight color is used to highlight the importance of business data. For the real-time changing data, the broken line graph and dynamic effect are used to transmit a visual effect of data update to users, which can reduce the visual fatigue of users, increase the visual interest and improve the user experience.

4.2 Difficulties in designing large screen government information interface

The first difficulty of government big data visualization information large screen interface is large size. A small amount of data filling on the huge screen will not only make the user feel the interface empty, but also distract the user's visual attention due to the scattered information points on the screen. The second difficulty is that government data comes from all aspects of data generated by real users in social activities. The amount of data is large, but data classification is difficult. The third difficulty is the wide use of government data. At present, government data is more concerned about the analysis of data. The conclusions drawn from the analysis generally pave the way for the next stage of urban management and make reasonable prediction for the occurrence of future events, so as to make more scientific preparation scheme. For example, the new coronavirus event in early 2020 has

aroused the attention of people all over the country. In the special moment of staying at home, the first thing everyone wakes up every day is to check the latest epidemic area and care about friends and family around them. Until the new coronavirus fermentation abroad, big data information visualization is telling the latest progress of epidemic situation all over the world. The resolution of future events is the most daunting and challenging thing for human beings. In the era of advanced information technology, it is the current human beings who are unable to move.

After this, global attention to the new coronavirus event. Big data information visualization plays an important role in the field of government big data. Government departments direct the work of all departments to carry out their work. Through the digital visualization large screen command system, the Transportation Bureau can quickly check the license plate number in high-risk areas, the food hygiene supervision and management department can check the source of import and export food through the large screen monitoring, and the hospital department can report the safety to the family members through the network conference on the visual large screen, etc. in the non-contact environment, the society can still feel the operation, and the big data information can be visualized. It is not difficult to find that big data information visualization UI interface design is an art, but also a knowledge worthy of in-depth study. Until the end of May 2020, when the epidemic situation is in a stable period, China will gradually return to work and production. People travelling around the country with health codes can see the most commonly used large visualization screen next to the security personnel. This screen also links to the camera, intelligent thermometer and alarm system. Once the body temperature is abnormal, the physical alarm and visual warning signs appear on the large screen, and the endless stream of people will be still when they receive the alarm information.

4.3 Innovation points of FUI style applied to government big data information visualization

At present, the FUI interface can be divided into minimalist type, neon type and three-dimensional type. According to the industry characteristics of government big data, the FUI interface can be divided into natural information, urban construction, urban health management, statistical supervision, service and people's livelihood consumption data. Some practitioners believe that the theme elements of government big data information visualization screen are rich enough, without too much interface color embellishment. In fact, this kind of cognition is not comprehensive. In the face of 3D visualization scenarios, many business forms still need a lot of UI interfaces to show the visual charm of big data information visualization. As the preferred style of government big data information visualization, the main innovations of FUI are as follows:

4.3.1 The design elements are novel, filling the gap of large screen data.

In the era of flat and minimalist style, FUI uses slightly complex and changeable lines and weak scientific and technological particles to make large screen visualization rich and full. The reference of interface elements in science fiction film and television production makes the government big data information visualization full of future sense of science and technology.

4.3.2 The design layout is reasonable, and the classification of government business data is distinct.

The FUI style layout adopts left middle right layout, which is designed by referring to the grid format of web page. Each part has its own subheadings with clear levels. The middle area mostly adopts flat design, which is easy for dynamic interaction design, and conforms to the user's gesture operation and visual browsing behavior habits in the mobile Internet era. Meanwhile, the FUI block layout is also easy to program development and implementation, so as to improve the utilization rate of single screen display of government departments. For the user's urgent concern, it can be displayed in the best position of human vision at any time. For example, a user is viewing the new epidemic situation in a city and switching to the new epidemic situation in the whole province.

4.3.3 Visually predict, let users feel the future is expected.

Big data information visualization adopts the FUI style design, which can quickly make users who have been deeply influenced by foreign science fiction films and TV works feel the sense of future high-tech. In foreign science fiction films and TV works, the characters who can use these FUI style interfaces are mostly Marvel heroes who protect all mankind. This deep-rooted hero image goes deep into the hearts of hundreds of millions of people. Therefore, for the government departments that use high-tech to predict future events, users will also be quickly brought into the government's scientific decision-making, which will lead everyone to overcome the dark and welcome the dawn of the environment. This is also the unique visual charm of the FUI style of big data information visualization.

5 Conclusion

The FUI style of big data information visualization can not only be applied to the design of government big data industry, but also has certain reference significance for the design of smart city in the future. The research field of future design in developed countries is earlier than that in developing countries. We should pay more attention to and study the information data that can be applied to the prediction of future events. This research on the FUI style design of government big data visualization is just the tip of the iceberg in the field of big data information visualization. I hope more researchers can participate in

this research and contribute to the design style of building a smart city.

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