Research on Visualization Generation Method of Panoramic Portrait from the Perspective of Power Grid Customer Service Center Commissioner

Cuixian Yin [1*], Yuqi Zhang[2], Lu Liu[3], Ruiping Pan[4], Meng Wang[5]

{1797465317@qq.com[1*],zhangyuqi_0411@126.com[2],Liuluhhs@126.com[3],632130144@qq.com[4], 994257055@qq.com[5]}

State Grid Customer Service Center, Tianjin, 300300, China

Abstract. Conventional panoramic image visualization generation methods mainly use MSTP (Multiple Spanning Tree Protocol) multi spanning tree protocol to process visualization information, which is vulnerable to the impact of traffic load redundancy, resulting in poor performance of the generated visual panoramic image. Therefore, a new panoramic image visualization generation method needs to be designed from the perspective of the power grid customer service center commissioner. That is to say, based on the perspective of the commissioner of the power grid customer service center, the panoramic portrait visualization architecture is constructed, the user portrait of multi-source data fusion panoramic visualization is generated, and the panoramic portrait visualization model is predicted, thus realizing the generation of panoramic portrait visualization. The experimental results show that the designed panoramic portrait visualization generation method has high operation and maintenance support rate, operation and maintenance mastery rate, and security protection rate, which proves that the designed panoramic portrait visualization generation method has good generation performance, reliability, and certain application value, and has made certain contributions to promoting the development of smart grid.

Keywords: Power grid; Customer service center Commissioner; Angle of view; Panoramic portrait; Visualization; Generate; Way.

1 Introduction

Panoramic portrait visualization is a technology that presents the scene or environment in an all-round and panoramic way through technical means. It is widely used in the fields of virtual reality, augmented reality and 3D modeling, and can create panoramic images, so that observers can feel all-round scenes in static images [1-3] . Panoramic portrait visualization usually uses a special camera or splicing multiple photos to create a panoramic image. In the field of virtual reality and augmented reality, panoramic portrait visualization can provide immersive experience, so that users can feel the scene personally.

As the Commissioner of the power grid customer service center, the method for visually generating the panoramic portrait can include the following steps: data collection: collecting relevant data of the power grid customer service center, including customer complaints, consultation, business handling and other data, as well as data of power grid operation status,

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equipment maintenance and other aspects [4-7] . Data cleaning and processing: ensure the quality and accuracy of data. Data analysis and mining: deeply analyze and mine the processed data, and extract useful information and knowledge, including customer behavior patterns, electricity consumption behavior analysis, power grid operation status, etc. Visual presentation: The results obtained from analysis and mining are presented in a visual way, including charts, images, videos, etc. [8-11] , so as to display data and information more intuitively. Decision Support: Through the method of visual generation of panoramic portrait, it provides support for the decision-making of power grid customer service center, including customer satisfaction improvement and power grid optimization, and improves the work efficiency and customer satisfaction of power grid customer service center. As the Commissioner of the power grid customer service center, he needs the ability of data analysis, visual presentation and decision support, in order to better complete the work [12-17] . At the same time, we need to constantly learn and master new technologies and methods to adapt to the changing market demand and customer service requirements. Related researchers have designed several conventional panoramic image visualization generation methods according to the characteristics of panoramic image visualization generation, including the panoramic image visualization generation method based on user characteristics and the panoramic image visualization generation method considering local characteristics. However, the conventional visualization generation method is not effective and does not meet the current requirements. Therefore, this paper designs a brand-new panoramic image visualization generation method from the perspective of the power grid customer service center Commissioner.

2 Design of visual generation method of panoramic portrait from the perspective of commissioner of power grid customer service center

2.1 Power grid customer service center commissioner perspective to build a panoramic portrait visualization architecture

The perspective of the power grid customer service center Commissioner refers to the perspective of observing, analyzing and summarizing the work content and process of the power grid customer service center from the perspective of the power grid customer service center Commissioner. From this perspective, the focus is mainly on the workflow, customer service and business processing of the power grid customer service center [18-20] , aiming to find out the existing problems and deficiencies through observation and analysis of these aspects, and put forward suggestions and measures for improvement and optimization. Therefore, this paper constructs a panoramic portrait visualization framework from the perspective of the power grid customer service center Commissioner. First of all, we need to process data according to user portraits and user events. The schematic diagram of data processing is shown in Figure 1 below.

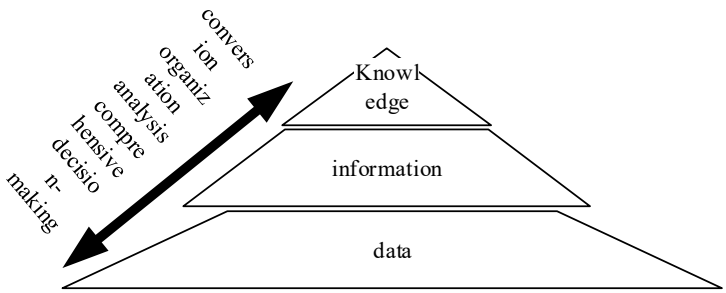

Fig. 1. Data Processing.

As can be seen from Figure 1, the processed panoramic image visualization data is more informative, organized, comprehensive and decision-making. Therefore, a panoramic image visualization framework can be constructed based on the processed data, as shown in Figure 2 below.

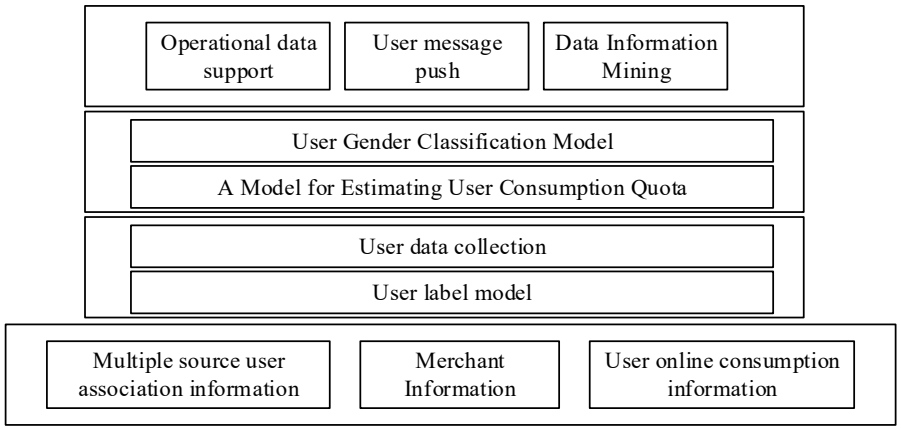

Fig. 2. Visualization architecture of user panoramic portrait.

It can be seen from Figure 2 that the panoramic image visualization architecture built in this paper is mainly supported by MySQL. HDFS and Hive are used to create user scenarios, which maximizes the generation effect of panoramic images [21-23] .

2.2 Generate multi-source data fusion panoramic visualization user portrait

In order to solve the problem of data flow in the process of generating panoramic visual user portraits, this paper optimizes the storage of panoramic visual images. This paper uses hierarchical storage method to query the active data [24] existing at different times, and then constructs user portraits according to the recent dynamics of users. The schematic diagram of data storage design is shown in Figure 3 below.

Fig. 3. Schematic diagram of data storage design.

As can be seen from Figure 3, after being stored according to the above-mentioned data storage schematic diagram, external data can realize multi-source fusion, obtain statistics and transformation processing information of different business modules in real time [25] , and then supplement the identity, attributes and loyalty of users by using association rules. At this time, the generated data fusion panoramic visual user portrait is shown in Figure 4 below.

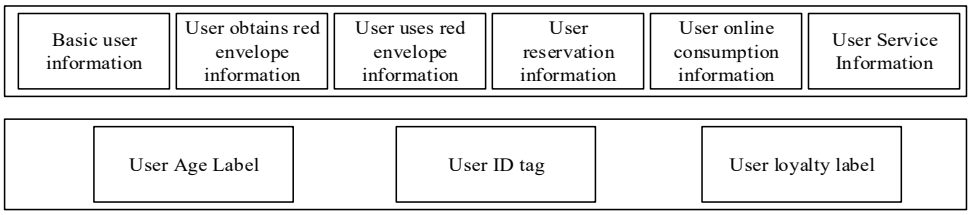

Fig. 4. Data Fusion Panoramic Visualization User Portrait.

As can be seen from Figure 4, the generated data fusion panoramic visualization user portrait can subdivide the user feature dimension of each aspect, improve the fitting degree of the generated panoramic portrait from top to bottom, and reduce the generation risk of the panoramic portrait.

2.3 The panoramic portrait visualization model prediction

According to the above-mentioned data fusion panoramic visualization user portrait, this paper predicts the panoramic portrait visualization model. First, it needs to collect user information, expand additional information according to the existing data table or related business, and then transform the data information, divide the time dimension according to the user's age tag, and predict the age tag model as shown in the following (1).

$$User = \max(count(user, song - fre - age)) . \tag{1}$$

In the formula (1), $count$ represents a user presence attribute, $user$ represents the age of the presumed user, $song - fre - age$ represents the user's age and time dimension, the visual generation dimension of different application scenarios is different, and the generation conditions of panoramic portraits are also different. In order to reduce the visual generation error of panoramic portraits, the identity tag model $User_{isstudent}$ predictive formula generated in this paper as shown in the following (2).

$$User_{isstudent} = slseif(x_{shop} + x_{time}) . \tag{2}$$

In the formula (2), $slseif$ represents the user subscription characteristic parameter, x_{shop} Represents the identity median value, x_{time} represents the weight of reservation features, user

behavior has certain randomness, so we can use the principle of time reduction to process behavior tags in real time, and the time tag $weight$ prediction formula at this time is shown in the following (3).

$$weight = \log(length \backslash 1500). \tag{3}$$

In the formula (3), $length$ represents the time span interval, and the weighted average calculation can be carried out by combining the above prediction formula. The calculation formula W is shown in the following (4).

$$W = \frac{shop - cnt + des - cnt}{des - cnt}. \tag{4}$$

In the formula (4), $shop - cnt$ represents user activity, $des - cnt$ represents the total frequency of various behaviors of users, and based on this, calculates the loyalty of panoramic portraits C as shown in the following (5).

$$C = User + User_{isstudent} + weight. \tag{5}$$

In formula (5), represents that the user profile coverage dimension can be calculated by using the above different tag predictors, and the generated panoramic portrait visualization model E is shown in (6) below.

$$E = \frac{K_Y}{K_X}. \tag{6}$$

In the formula (6), K_Y represents a transient transformation value, K_X represents the weight of three-dimensional rendering, and the final attributes of different users can be determined after the panoramic portrait visualization model is predicted, thus ensuring the performance of generating panoramic portraits.

3 Experiment

In order to verify the generation effect of the designed panoramic portrait visualization generation method from the perspective of the power grid customer service center Commissioner, this paper configures a basic experimental platform, and compares it with the conventional panoramic portrait visualization generation method based on user characteristics and the panoramic portrait visualization generation method considering local characteristics, and carries out experiments as follows.

3.1 Experimental preparation

According to the requirements of panoramic portrait visualization experiment, this paper selects Krpano panoramic software as the experimental software. It is known that this panoramic software belongs to 3D panoramic software with good performance, strong compatibility and interactivity. It can be rendered in two modes of Html5 Flash for secondary

programming and development. The production process of Krpano 3D panoramic portrait experiment scene is shown in Figure 5 below.

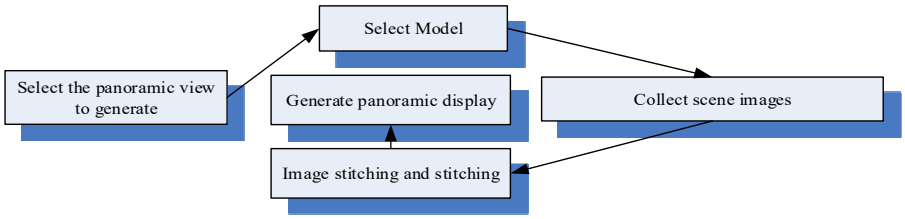

Fig. 5. Production process of Krpano experiment scene.

It can be seen from Figure 5 that after making the Krpano experiment scenario, the basic experiment business database information can be generated, as shown in Table 1 below.

Table 1. Basic Experimental Business Database Information.

Data number	Basic data	Flavonolignans
field 00195	DZZH	DZZHHWRWREJY16M
field 00164	YZBJ	YZBJHNSLZEJY16M
field 00165	STHJXZ	STHJXZHMZRREJY16M
field 00138	STHJBQ	STHJBQHHPZHEJY16M
field 00124	DXDM	DXDMHDMTXEJY16M
field 00186	QYDZ	QYDZHDMCJEJY16M
field 00144	DZZH	DZZHHDMCJEJY16M
field 00175	STHJBQ	STHJBQHDLFZEJY16M
field 00139	DXDM	DXDMHBTZHEJY16M

Table 1 shows that the business database stores different experimental data, shows the categories and display fields of different experimental scenarios. The experimental platform uses the FTP interface server to fetch data and execute the panoramic portrait visualization generation instruction. In combination with RBAC auxiliary control to manage the experimental role permissions, the role assignment relationship of the RABC model is shown in Figure 6 below.

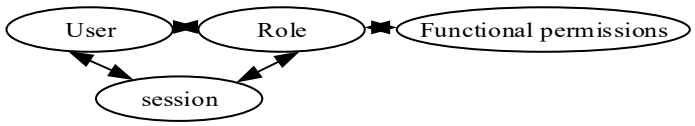

Fig. 6. Role Assignment Relationship of RABC Model.

It can be seen from Figure 6 that the RABC model determines roles as different abstract control processes, and uses True to uniformly solve them to generate a tree like structure. In addition, the experiment uses B\S mode to uniformly interact information, and uses Browser to carry out parallel control. After the above steps are completed, this paper selects the

operation and maintenance support rate Y_Z, operation and maintenance mastery rate Y_W, safety protection rate Y_F as an experimental index, the calculation formulas are as follows (7)~(9).

$$Y_Z = \frac{C_A}{F} \times 100\% . \tag{7}$$

$$Y_W = \frac{C_U}{F} \times 100\% . \tag{8}$$

$$Y_F = \frac{C_Q}{F} \times 100\% . \tag{9}$$

In formulae (7) to (9), C_A represents the logical control weight, C_U represents the data access weight, C_Q represents the safety separation weight, F represents the comprehensive visualization coefficient. The higher the operation and maintenance support rate, operation and maintenance mastery rate, and security protection rate, the better the generation performance of the panoramic portrait visualization generation method. On the contrary, the lower the operation and maintenance support rate, operation and maintenance mastery rate, and security protection rate, the poorer the generation performance of the panoramic portrait visualization generation method.

3.2 Experimental results and discussion

Combined with the above experimental overview and preparations, we can conduct panoramic portrait visualization generation experiments, that is, use the panoramic portrait visualization generation methods designed in this paper from the perspective of the grid customer service center commissioner, the panoramic portrait visualization generation methods based on user characteristics, and the panoramic portrait visualization generation methods considering local characteristics to generate panoramic portraits, Use formula (7)~(9) to calculate the operation and maintenance support rate, operation and maintenance mastery rate, and security protection rate of panoramic images in different regions. The experimental results are shown in Table 2 below.

Table 2. Experimental Results.

Panoramic portrait visualization generation area	The operation and maintenance support rate of the panoramic image visualization generation method designed in this article from the perspective of the power grid customer service center specialist (%)	Operation and maintenance support rate of panoramic portrait visualization generation method based on user characteristics (%)	Operation and maintenance support rate of panoramic image visualization generation method considering local characteristics (%)
CN1139951	95.845	65.482	68.593
CP1139950	98.441	64.124	64.474

CA1114525	94.356	62.286	65.278
CW1158966	95.854	63.371	77.256
CR1148795	99.186	76.257	75.178
CW1152341	96.274	75.585	76.255
CJ1144528	95.778	64.289	62.475
CK1127559	98.265	78.385	53.325
CU1163858	97.746	64.175	79.865
CL1146514	95.365	75.274	75.442
CO1187936	96.874	73.286	67.336

Panoramic portrait visualization generation area	The operation and maintenance mastery rate of the panoramic portrait visualization generation method designed in this article from the perspective of the power grid customer service center specialist (%)	Operation and maintenance mastery rate of panoramic portrait visualization generation method based on user characteristics (%)	Operation and maintenance mastery rate of panoramic image visualization generation method considering local characteristics (%)
CN1139951	95.485	65.411	65.154
CP1139950	94.243	64.243	68.175
CA1114525	91.256	68.526	54.236
CW1158966	92.841	64.271	76.985
CR1148795	93.254	66.752	65.486
CW1152341	96.854	72.395	52.465
CJ1144528	99.214	73.485	73.224
CK1127559	95.286	76.365	65.176
CU1163858	98.484	69.741	68.285
CL1146514	97.248	78.289	69.369
CO1187936	96.163	64.253	74.874

Panoramic portrait visualization generation area	The security protection rate of the panoramic image visualization generation method designed in this article from the perspective of the power grid customer service center specialist (%)	Security protection rate of panoramic portrait visualization generation method based on user characteristics (%)	Security protection rate of panoramic image visualization generation method considering local characteristics (%)
CN1139951	95.451	65.541	65.456
CP1139950	94.104	64.253	64.841
CA1114525	92.204	62.265	61.785
CW1158966	93.482	63.748	62.236
CR1148795	96.253	76.181	76.985
CW1152341	99.556	79.563	76.448
CJ1144528	98.854	75.965	79.425
CK1127559	94.286	64.542	68.286
CU1163858	95.284	75.448	74.785
CL1146514	96.179	61.186	75.471
CO1187936	99.368	72.209	61.236

It can be seen from Table 2 that the operation and maintenance support rate, operation and maintenance mastery rate and security protection rate calculated by the panoramic portrait visualization generation method in different panoramic portrait areas from the perspective of

the power grid customer service center commissioner designed in this paper are high. The operation and maintenance support rate calculated by the conventional panoramic portrait visualization generation method based on user characteristics, as well as the panoramic portrait visualization generation method considering local characteristics Operation and maintenance mastery rate and safety protection rate are relatively low. The above experimental results prove that the panoramic portrait visualization generation method designed in this paper has good generation effect, reliability and certain application value.

4 Conclusion

With the continuous development and progress of science and technology, the power grid customer service center has become an indispensable part of the power industry. As the commissioner of the power grid customer service center, we not only need to master professional knowledge and skills, but also need to constantly explore and innovate to better serve customers and improve work efficiency. The visual generation of panoramic portrait is a very useful technology. It can present various information and knowledge of the power grid customer service center through data analysis and visual presentation, providing strong support for decision-making. In this paper, we introduced the methods and steps of panoramic portrait visualization generation, including data collection, cleaning and processing, analysis and mining, visual presentation and decision support. Through the method of visual generation of panoramic portrait, we can better understand the needs and behavior patterns of customers, as well as the operation status and equipment maintenance of the power grid. This helps us to better predict and respond to market changes and improve customer satisfaction and work efficiency. At the same time, the visual generation of panoramic portrait can also help us find and solve problems, and provide strong support for the future development of the power grid customer service center. In a word, the visual generation of panoramic portrait is a very useful technology, which can help the specialists of the power grid customer service center better serve customers and improve work efficiency. In the future work, we can continue to explore and innovate to better apply this technology and provide customers with better services.

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