



Analyzing the Visualization Research of Internet New Media in the Era of Big Data

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ABSTRACT

At present, with the advent of the era of big data, the academic community has developed a new method: network new media visualization in order to adapt to new needs and achieve the goal of presenting data content more clearly and comprehensively. This paper studies and analyzes the research on network new media visualization in the era of big data, mainly using network topology visualization technology and visual layout algorithm to achieve the technical realization of network new media visualization. The overall system framework separates the input module, processing module, and output module of the application, and then processes them separately. The logical relationship is as follows: The topology sends requests to the controller, the controller selects the corresponding model for processing, and sends the feedback information of the model to the controller. The controller selects an appropriate topology to generate a corresponding view. This paper first introduces big data visualization and network new media, then uses big data, network topology visualization technology and visual layout algorithm to design and implement a network new media visualization platform system, and finally releases sports news reports through the platform system. The survey focused on the difficulty of obtaining information and satisfaction with new models. The survey results show that in the era of big data, most netizens are very satisfied with and approve of the new model.

Keywords: *Big Data Era, Network New Media, Visualization, Platform System*

1. INTRODUCTION

Visualization is one of the innovative means of communication in the era of big data, and its widespread use is closely related to the arrival of the era of big data. The advent of the era of big data has opened up a new development model for the field of network new media [4]. With the extraordinary abundance of data, coupled with the explosion of information brought about by the Internet era, the audience's attention to things has been greatly shortened, so the media have begun to seek more direct and clear forms to quickly transmit information and help audiences better understand the content of the information. The visualization of new online media is developing rapidly in this context. The changes in the way of information dissemination in the era of big data have not only changed people's lifestyles, but also changed people's thinking and design thinking [7]. The visual design of network new media is one of the important ways of dissemination of information. It also includes a comprehensive cross-discipline of technology and art. While being affected and impacted by the

arrival of the era of big data, visual design of network new media The development of China has also brought new opportunities and challenges. The development of new media visualization research on the Internet can provide new forms of expression and design techniques for the dissemination of information, which also shows that the design models and design concepts of traditional media are no longer suitable for the development of the current era and the needs of society. We must reform the media We are constantly improving and seeking new innovative designs and expressions that can adapt to social development and the requirements of the times [5].

Chinese scholar Xuan Yongjie believes that the visual communication of data news is more and more sought after in today's new media environment, which satisfies the audience's inherent preference for visual effects and large selectivity. In recent years, data journalism is leading a new wave of dissemination in China, but there are also dissemination phenomena such as shallowness, homogeneity, and weak interaction [8]. Zhu Wei believes that with the progress of science and

technology, information dissemination models are also facing new development opportunities. Traditional media platforms can no longer meet the needs of contemporary society for information dissemination. New media technologies play an important role in information dissemination. With the development of the times, the concept of information design has also changed, and the new media environment is leading the innovation and reform of information visualization design; however, there are still some problems in the process of information visualization design. It is necessary to combine new media technology with in-depth analysis to solve the problems to clarify The future development direction of information visualization design [10]. Xiong Jingwen and others believe that with the continuous leap forward of new media technology, it has not only changed people's lifestyles, but also changed people's reading habits and ways of thinking, which has also brought greater challenges to designers. Therefore, how to quickly transform the way of thinking when big data suddenly arrives, analyze with new technical processing methods, process and display information visualization works that meet the requirements of the times is particularly important [9].

Visualization was not originally applied in the field of new media on the Internet, but in the field of scientific computing. It was not until the emergence of big data that visualization and big data were combined and applied to the new media industry on a large scale, and the research on the visualization of network new media began to emerge. The innovation of this article is to use big data technology to design a new online new media visualization platform, and use the platform to conduct sports news reporting experiments, in the form of online questionnaires, to evaluate the difficulty of obtaining information and the recognition of new models of netizens. Investigate, and finally draw relevant conclusions. The research in this article can provide a reference and reference for researchers related to network new media visualization.

2. VISUALIZATION OF INTERNET NEW MEDIA IN THE ERA OF BIG DATA

2.1. Current Status of Research at Home and Abroad

Under the background of the rapid development of science and technology, the visualization research of new online media has shown its own unique characteristics. However, the development of any media and the dissemination of information have to go through the inheritance stage of the traditional media-based information dissemination design. The visual design of network new media is one of the branches of the design field where information design and media intersect. As a

relatively new research topic, the research on visual design of network new media is also interspersed in the development history of information dissemination design [2][6]. Whether in terms of design techniques and concepts or digital technology, the development of foreign media is relatively early, and they are in a leading position in the form and design of the visual design of network new media. This is also the subject of this article on the subject of visual design of network new media. The continuous development provides prototypes and research that can be used for reference. With the continuous changes and enrichment of the new media visualization research system, foreign countries have begun to try to use new forms of expression and design techniques to express creativity and the dissemination of information [3]. Foreign scholars believe that the process of information dissemination requires some uniquely designed artistic aesthetic styles that are rarely seen by the public. At the same time, they look forward to using some advanced media technologies to reform the expression forms and design techniques of traditional media in information visualization design, design a sustainable form of expression and design style that adapt to the development of the trend of the times [1]. Our society is advancing with the development of technology. In the era of big data, people are thinking about whether they can better use advanced digital technology to achieve the artistic aesthetics of information visualization design, which can break the time and space to the greatest extent. The domain is restricted, so that the information visualization design is full of unique artistic charm, resulting in more creative variability.

2.2. Data Collection of Sports Information

The core of sports news is sports data, and the raw material for visualizing sports news is also sports data. Therefore, the first step in constructing a visual sports news work is to collect data and information about sports games. With the rapid development of data collection technology, the types of existing sports data have also grown correspondingly. Different sports will produce different types of data. Due to the completely different competition venues and competition formats, the data generated will naturally vary widely. Different sports and the same sports will also produce different kinds of data under different data collection methods. Regarding the collection of sports data, as an emerging technology industry in the sports industry, sports data companies are also emerging as the country vigorously supports the sports industry. But compared with mature sports data companies abroad, China is still in its infancy. There are still many deficiencies in the accuracy of data and the definition of data collection rules. At present, the more mainstream sports data collection technologies include camera recording, thermal recording, wearable device collection and

manual recording, etc. Different methods are suitable for different scenarios, and collection methods can also be used in addition to achieve more accurate data accuracy. Traditional data statistics use manual manual collection of relevant sports data and input into the corresponding system. At present, the seemingly outdated method of manual statistics is still irreplaceable. At present, a large amount of sports data still depends on manual statistics.

2.3. Visual Coding and Interaction Design of Data

After collecting and sorting out the data, the most important step in the construction of visual news must be carried out, that is, visual transformation. As the name implies, visual transformation is a visual packaging of the data or stories in the opponent. If the previous collection and sorting are just laying the foundation, then the visual transformation step is to really polish the data. The visual transformation is not merely a creative behavior supported by inspiration, but a logical creative behavior that inherits the previous information collection and structure. In a general sense, visual transformation is the process of integrating text, color, graphic shape symbols, layout and other elements into layout design and information map production. With the aid of modern computer technology, computer programming can be used to automatically generate various standard schemas. In sports news, these standard schemas are widely used, but if a visual work is just a permutation and combination of these standard schemas, it would seem too tedious and lack potential information mining. So we need to do visual coding and some simple interaction design. Visual coding is to re-edit the data and relationships that need to be visualized, generally designing art and graphic design work; while interactive design requires the addition of programmers on the basis of art design to complete simple interaction design.

3. SYSTEM DESIGN OF VISUALIZATION RESEARCH ON INTERNET NEW MEDIA IN THE ERA OF BIG DATA

3.1. Network Topology Visualization Technology

Network topology visualization is the process of converting virtual data in the network into logical data, and then displaying the logical data in the form of dots and lines. Visualization is a course, it mainly uses the human eye perception ability and human brain intelligence to visualize the interactive expression of information, which can strengthen people's perception ability. Convert inconvenient or invisible information into perceptible marks to improve the efficiency of information recognition and convey effective

information, and then to perceive the potential characteristics, associations and forms of the information. How to obtain, analyze and use network topology data is also one of the research points that many research institutions care about. Consider network topology visualization as the main auxiliary method for analyzing and using network topology data. Its important purpose is to present the acquired information nodes and the relationship between nodes in front of customers in a clear and complete way, so as to help users understand and analyze the destination network. The whole state provides direct information and operation stage. Network topology visualization uses graphs composed of nodes and connections between nodes to present captured network information, and uses graphics to present network information to everyone. Nowadays, network new media urgently needs a network topology visualization system to ease the workload of new media workers. This system can efficiently and interactively display and obtain network node information and the relationship between nodes. Under such circumstances, research and development of a network topology visualization system is of great significance. The commonly used formulas in the network topology visualization system are:

$$X(k) = [X_r^T(k), X_i^T(k)]^T \quad (1)$$

3.2. Visual Layout Algorithm

The core idea of the force-guided layout algorithm is Hooke's law. When two nodes are far apart, they are attracted to each other. When the distance reaches a certain threshold, they are mutually exclusive. It is highly praised for clearly showing the relationship between nodes. Its principle is that each node will have repulsion and gravitation, and there will be gravitational force between adjacent nodes, and there will be repulsion between all nodes. The gravitational force of is greater than the repulsive force, then the positions of the two nodes will be adjusted very close; once the repulsive force between the two nodes is greater than the gravitational force, then the positions of the two nodes will be adjusted far. That is to say, the closeness of the relationship between the nodes can be seen from the distance between the nodes. Too far distance indicates that the relationship between the two nodes is distant, and the close distance indicates that the relationship between the two nodes is close. Moreover, because of the repulsive force, a certain distance will be generated between the nodes, and the overlap effect between the nodes will be reduced. The force map mainly includes: charge repulsion, gravity, and friction. The charges between the nodes in the topology map are mutually exclusive to ensure that the nodes do not overlap; the gravity is expressed as the farther the nodes are from the center of gravity, the greater the gravity.

The relative layout of the topology map is completed and the nodes are relatively compact. The friction force is expressed as the energy decay speed, the greater the friction force, the faster the stop speed of the force map. The essence of the force guidance algorithm is to continuously adjust the position of the node according to the mechanics formula to achieve a relatively balanced state. In the chaos stage, the layout algorithm will traverse all nodes, calculate the gravitational force of adjacent nodes and the repulsive force of non-adjacent nodes. After the calculation is completed, it will be converted to the node target position of this iteration, and then it will be displaced. After the displacement is completed, this time at the end of the iteration, the energy attenuation of each iteration of the force map is 96%, and the calculation stops when the energy is less than 3%. The calculation formula of the force-guided layout algorithm is:

$$D^2(x, y) = (x - y)^T V^{-1} (x - y) \quad (2)$$

3.3. The Overall Design of Network New Media Visualization System

The overall framework of the system separates the input module, processing module and output module of the application and processes them separately. The logical relationship of the three is: the topology map sends a request to the controller, and the controller selects the corresponding model for processing, and the feedback information of the model is sent to the controller, and the controller chooses the appropriate topology map to generate the corresponding view. The model provides the content to be displayed to the topological diagram, and at the same time, it can realize that a new model creates a topological diagram without rewriting the model. As long as the data in the model changes, the topological diagram will be notified by the model, and the corresponding topological diagram will be renewed. The model can be reused, the model

topology diagram and the controller are independent of each other, and one or more of them can be transplanted to the new work platform separately, thereby greatly improving the research and development efficiency. The job of the topology map is to think about how to display the data in the interface reasonably. The model only needs to consider how to maintain data and process business logic. The division of labor and cooperation among the three have greatly improved the efficiency of research and development. In this article, the corresponding model contains node information, business information, protocol information, and relationship data between nodes, etc., and provides operations for adding, deleting, modifying, and checking corresponding data. The topology map is displayed in the client browser. The topology diagram in this article corresponds to related controls. The controls perform operations such as data acquisition, component creation, data binding, and rendering control. The results of these operations will eventually be presented on the visualization page. The core calculation formula of the network new media visualization system is:

$$\Gamma(r) = \int_0^{+\infty} e^{-x} x^{r-1} dx \quad (3)$$

4. ANALYSIS OF APPLICATION RESULTS OF NETWORK NEW MEDIA VISUALIZATION SYSTEM

The designed and implemented network new media visualization system was used to research, and the system was used to report sports news information, and 200 netizens who watched the report were surveyed on the Internet.

4.1. How Easy it is for Netizens to Obtain Sports News Information Reported by the New Online Media Visualization System.

Table 1. Obtain the ease of information

Degree of difficulty	Number of people	Percentage
Very easy	58	29%
Relatively easy	94	47%
Not difficult	36	18%
More difficult	12	6%

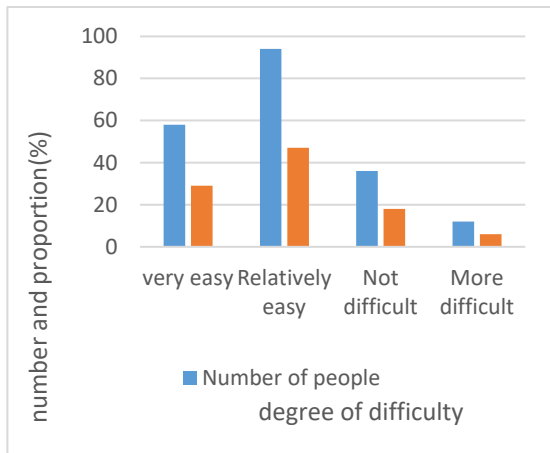


Figure 1. Obtain the ease of information

According to Table 1 and Figure 1, we can know that using the sports news released by the new media visualization system designed in this article, 76% of the 200 netizens who watched the released sports news thought it was easier to obtain information, and 94% of the netizens obtained it. There is no problem with the information. Only 6% of netizens find it difficult to obtain news information released from the visualization system. Through detailed analysis, the reason why 6% of netizens find it difficult to obtain information is related to their poor ability to accept new things and their inability to quickly adapt to the new media visualization system in the era of big data.

4.2. Netizens' Satisfaction with the New Model of Sports News Reported by the New Online Media Visualization System.

Table 2. Satisfaction of the new model

Satisfaction level	Number of people	Percentage
Very satisfied	42	21%
More satisfied	84	42%
Generally satisfied	48	24%
Dissatisfied	26	13%

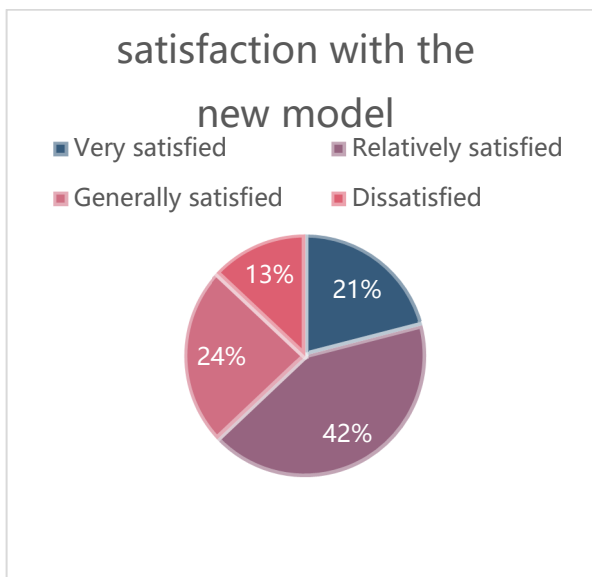


Figure 2. Satisfaction of the new model

According to Table 2 and Figure 2, we can know that 63% of the 200 netizens who watched the sports news released by the new media visualization system designed in this article are more than satisfied with the new information model. 87% of netizens approve of obtaining news information through the new model, and only 13% of the netizens gave unsatisfactory comments on the new model of obtaining news information from the visualization system. Through detailed analysis, 13% of netizens gave unsatisfactory evaluations because they were older, did not like to change the previous information acquisition mode, and had different

opinions on the new media visualization system in the era of big data.

5. CONCLUSIONS

The impact of the arrival of the big data era has penetrated everywhere in our lives. With the continuous development and maturity of data collection and visualization technology, today's society has entered an era of mass production, application, and dissemination of data. This article first quickly popularizes big data and visualization knowledge, then conducts in-depth research on big data technology, and designs a new media visualization system. Finally, through the designed new media visualization system, a network questionnaire survey is conducted on netizens, and the results of the survey are It shows that the network new media visualization system in the era of big data designed in this paper is relatively successful.

REFERENCES

- [1] Cheng Sidan. On the visual management of radio and television archives in the era of new media[J]. Volume, 2019, 009(016):117.
- [2] He Ping. The innovative path of news data visualization design and dissemination in the new media era[J]. Research on Communication Power, 2019, 003(031): P.97-98.
- [3] Liu Tianping, Wang Linfa. Visual Reading: New Trends of Information Visualization in the Context

- of New Media[J]. Journal of Shandong Agricultural Administrators College, 2019, 036(011):155-159.
- [4] Lin Fulong. Exploration of the visualization of paper news in the new media era[J]. Science and Technology Communication, 2020, v.12; No.251(02):69-70.
- [5] Meng Zhirong. Exploration of the visualization of paper media news in the new media era[J]. Journalist's Cradle, 2019, 580(04):9-10.
- [6] Tian Xin. Exploring the information visualization design under the new media environment[J]. Information Recording Materials, 2019, 020(011):118-119.
- [7] Wang Xue. Highlights and development of visualized broadcast scheduling under the integration of new media[J]. China Media Technology, 2020, No.325(04):83-85.
- [8] Xuan Yongjie. In-depth study of news based on data visualization in the new media environment[J]. Audiovisual, 2019, 144(04):189-190.
- [9] Xiong Jingwen, Su Qing. New media information visualization application design and research[J]. Drama House, 2019, No.326(26):233+235.
- [10] Zhu Wei. Information visualization design under the new media environment[J]. Information and Computer (Theoretical Edition), 2019, 419(01):34-35.

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