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Retraction

Retracted: Application of Computer Technology in VR Digital Media

Wireless Communications and Mobile Computing

This article has been retracted by Hindawi following an investigation undertaken by the publisher [1]. This investigation has uncovered evidence of one or more of the following indicators of systematic manipulation of the publication process:

(1) Discrepancies in scope
(2) Discrepancies in the description of the research reported
(3) Discrepancies between the availability of data and the research described
(4) Inappropriate citations
(5) Incoherent, meaningless and/or irrelevant content included in the article
(6) Peer-review manipulation

The presence of these indicators undermines our confidence in the integrity of the article's content and we cannot, therefore, vouch for its reliability. Please note that this notice is intended solely to alert readers that the content of this article is unreliable. We have not investigated whether authors were aware of or involved in the systematic manipulation of the publication process.

Wiley and Hindawi regrets that the usual quality checks did not identify these issues before publication and have since put additional measures in place to safeguard research integrity.

We wish to credit our own Research Integrity and Research Publishing teams and anonymous and named external researchers and research integrity experts for contributing to this investigation.

The corresponding author, as the representative of all authors, has been given the opportunity to register their agreement or disagreement to this retraction. We have kept a record of any response received.

References

[1] W. Zhang, J. Wang, and H. Wang, "Application of Computer Technology in VR Digital Media," *Wireless Communications and Mobile Computing*, vol. 2022, Article ID 6433852, 8 pages, 2022.

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Research Article

Application of Computer Technology in VR Digital Media

Weiguo Zhang [ID], Junming Wang [ID], and Hui Wang [ID]

Yantai Nanshan University, Yantai, Shandong 265713, China

Correspondence should be addressed to Hui Wang; 16095104210013@hainanu.edu.cn

In order to make up for the defects of traditional digital media system design, continuously strengthen the user's sense of experience, and further improve the digital media system design through diversified digital media forms, this paper proposes an application method of computer technology in VR digital media. Through the introduction and research of human-computer interaction interface, the usability of human-computer interaction interface evaluation and testing is analyzed, and combined with GOMS model to optimize and improve the model, a new optimized GOMS layered quantitative model is proposed. The experimental results show that when the system is running, the trend of video cache rate in WiFi and 4G environments is basically the same. The playback start rate is fast and then tends to be stable. During the playback process, the video frame rate is stable at about 60 FPS, which meets the needs of human eyes to watch without Caton. After the playback starts, the GPU occupancy rate remains about 20% and stable. Computer technology can realize the effective combination of multiscreen interaction and digital media in VR digital media, creating a better prospect interactive experience for the future development of digital media mobile terminal.

1. Introduction

Computer VR technology is a new digital information technology emerging in recent years. It is the product of the integration of science and information technology. The emergence of this technology depends on the generation of computer technology. The full name of VR technology virtual reality, and the Chinese name is virtual reality technology. According to the Chinese literal meaning of VR technology, VR technology cannot let users truly experience a certain scenario, but it is a technology that creates a virtual environment for users to experience in the virtual environment. Computer VR technology is a simulation technology to create a virtual environment with the help of computers [1, 2]. The main principle is to create a dynamic three-dimensional simulation world through computers, so that users can get a sense of immersion and experience in the three-dimensional world and experience the virtual world and environment.

To establish a virtual space with VR technology, we need to combine a variety of technologies. VR technology combines three-dimensional modeling technology, image pro-

cessing technology, and sensor technology. VR technology can be applied to many fields, such as computer image technology, network technology, media information communication technology, and intelligent database technology. These different technical fields have a common feature. Their birth is due to the information communication between machines and users. The main difference is that the forms of information communication are different. In the content category of VR technology, information expression is a major information technology, and it is also the main medium for information exchange between mechanical equipment and users [3, 4]. The information communication of VR technology enables users to further create a more immersive experience of the three-dimensional simulation world. Virtual reality technology is not a simple virtual multimedia information technology. Users can get a real feeling in the virtual environment under the action of sensors, so that users can get visual, auditory, and tactile experience in the three-dimensional simulation world and gain the same experience as the real world. In the follow-up development, virtual reality technology has been applied to high-level multimedia applications because of its own

application characteristics. As a technology integrating computer technology, graphic technology, psychological technology, visual technology, stereo display technology, and other technologies, virtual reality technology has obvious fidelity and interactivity, and it can provide strong support for system simulation. At present, virtual reality technology has the following three characteristics.

2. Literature Review

Digital media system is an information carrier mode with the functions of recording, generation, dissemination, processing, and intelligent acquisition, specifically including digital animation, text information, communication network, and other diversified media forms [5, 6]. The application of computer VR technology in the design of digital media system can enable the cross-border integration and development of information expression, which is conducive to further optimizing the design of digital media system and further strengthening the sense of user experience. In the design of digital media system, computer VR technology can generate computer simulation according to the diversified needs of different users and bring users into a virtual environment [7]. This communication method can make users feel immersive. Compared with other information communication methods, it has outstanding advantages in timeliness, because when users enter the virtual environment, the whole person is like being integrated into the scene, which can not only continuously obtain information but also freely control objects in the virtual world through sensors and controllers in the virtual world, so as to obtain the same feeling as the real world [8].

Different information expression methods are adopted in the design of digital media system to strengthen the user experience [9]. The biggest difference between traditional media and digital media is the interaction between users. Generally speaking, the degree of information received and participation of users are often determined by the degree of interaction. The application of computer VR technology in the design of digital media system can show the rich amount of information in a simple way according to the diversified needs of users, so that users can easily understand and obtain this information on the basis of meeting the real needs of users. Driven by the rapid development of science, technology, and society, people have officially entered the era of big data. With the emergence and further development of artificial intelligence information technology, the whole society has gradually entered the digital era. The media industry has also achieved a leap forward development from traditional media such as newspapers and television to digital media. In this process, it has experienced the stage from quantitative change accumulation to qualitative change. From mutual integration to innovative development, it can be found that the future informatization development presents significant ecological characteristics [10].

In the digital media ecosystem, the relationship between various media forms is close, and they do not exist in an independent way but are interactive. Even with the support of VR technology, media technology innovation can be real-

ized to further expand the breadth and depth of virtual technology [11]. In the diversified virtual environment established by VR technology, the digital media ecosystem can establish user information and transmit it. Combined with the characteristics of resources and data, the digital media ecology can have a new connotation. In the design practice, to build a digital media ecosystem based on computer VR technology, the following work should be done well. First, further improve the information transmission mode; that is, organically integrate the digital media system design and computer VR technology. The integration of computer VR technology not only realizes the transmission of video, image, and other information but also further optimizes the way things are expressed in the virtual world according to the characteristics of users, so that users can get a better virtual experience in the virtual world, so that digital image technology is no longer simply building a simulation world but is endowed with richer and new significance. Second, paying attention to the full integration of users' practical experience and image information, guiding users, and designing interactive digital media based on experience are the key to establishing a digital media ecosystem and an important measure to enhance users' interaction, which is conducive to improving users' participation [12]. Third, further improve the experience equipment related to computer VR technology. The research and development of innovative ecological sensors can not only promote the high integration of the user's body and mind and the virtual environment but also fully integrate the user's senses with the virtual environment, which is conducive to further strengthening the user's sense of experience and promoting the integrated development of mobile media and intelligent data. Therefore, this paper proposes the application of computer technology in VR digital media.

3. Research Methods

3.1. Overview of Relevant Technologies

3.1.1. Overview of Stereoscopic Vision Perception. Because the human stereoscopic algorithm is relatively independent of its neural implementation, the study of human stereoscopic calculation model is helpful for engineering application and design using stereoscopic method [13]. When viewing an object, at the same time, two different images enter your left and right eyes through different angles. The human brain obtains the feeling of distance and depth by analyzing and synthesizing the two images. When we watch, we always have a three-dimensional feeling; that is, we can feel the distance between objects and also the distance between objects and us. The parallax effect can be observed only when two images are generated according to the left and right viewpoints of the human eye. When observing, the left eye and the right eye must see the graph generated according to the left and right viewpoints, respectively. Suppose that the coordinates of a point in the space are the right viewpoint, its coordinates are the left viewpoint, its coordinates are (x_l, y_l, z_l), and the equation of the viewing plane is
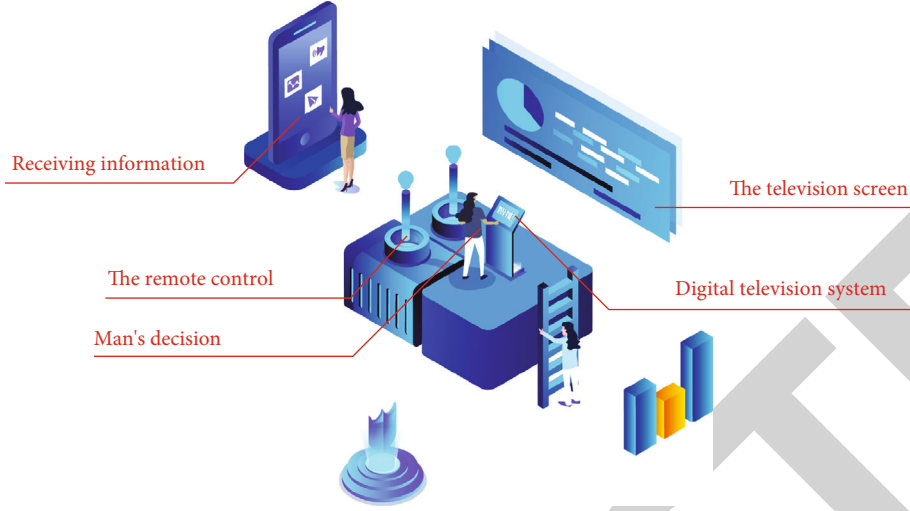
$$Ax + By + cZ + D = 0. \tag{1}$$

FIGURE 1: Human-computer interaction interface of digital media.

Then, the intersection point S_R^0 of the line between the point I and the right viewpoint S_R and the viewing plane is the drawing point when the right eye views I, and its coordinate is (x_r^0, y_r^0, z_r^0). The intersection point s_l between the line of point I and the left viewpoint S_l^0 and the viewing plane is the drawing point when the left eye views I, and its coordinate is (x_l^0, y_l^0, z_l^0). To synthesize point parallax map, the coordinates of point S_k^0, S_l^0 must be obtained.

The equation for the left line of sight is

$$\frac{x_l^0 - x_l}{x_1 - x_l} = \frac{y_l^0 - y_l}{y_1 - y_l} = \frac{z_l^0 - z_l}{z_1 - z_l} = t_l. \tag{2}$$

The equation for the right line of sight is

$$\frac{x_r^0 - x_r}{x_t - x_l} = \frac{y_r^0 - y_r}{y_t - y_l} = \frac{z_r^0 - z_r}{z_t - z_t^1} = t_r. \tag{3}$$

According to the algorithm of calculating the parallax transmission of points, we can deduce the parallax transmission algorithm of lines and planes. When generating the parallax projection of points, volumes, and planes on the computer, it is more accurate and faster than using the traditional method.

3.1.2. Human Computer Interface. Human-computer interaction interface (HMI) mainly refers to the main media interface that can realize information transmission and exchange between people and computers and can meet the general interface of various equipment and be used for the equipment software connection of computer terminals [14]. The design of human-computer interaction interface usually refers to the user visible page in the human-computer interaction operation, and the human-computer interaction interface realizes the communication and operation between human and system. The human-computer interface mainly includes two parts: hardware and software.

Human-computer interface, also known as machine, is not only the output object of information reaction but also an important carrier of information interaction between human and system. Software is the form of graphic information finally displayed based on hardware.

3.1.3. Human Computer Interface of Digital Media. For digital media, the realization of human-computer interaction interface can fully transmit information between TV users and digital media. As shown in Figure 1, the human-computer interface of digital media can transmit information. People can obtain and process the content information of digital media through the TV screen, make corresponding decisions in combination with specific needs, and feed back to the digital media system [5].

In the design of human-computer interaction interface of digital media, the friendly operation between human and machine can be directly realized for the information display, operation, and specific response in the digital media page [15]. In human-computer interaction design, how to achieve rapid and efficient interactive operation of digital media pages and whether the human-computer interaction interface design is consistent with people's own cognitive laws, physiological reactions, etc. are very important for human-computer interaction experience. Therefore, the design of human-computer interactive digital media interface needs to ensure that the structure is reasonable, easy to operate, and consistent with the public aesthetic, so as to improve the digital media interaction experience.

3.2. Multiscreen Digital Media Interactive Interface Information Display. When designing the digital media interface, it is necessary to input the corresponding final design task results, complete the corresponding logic module design, add the corresponding access mechanism, and then organize these modules as the main interface structure modules. Establish the access mechanism as a network and layered direct mechanism, directly determine the mechanism

Shallow and broad

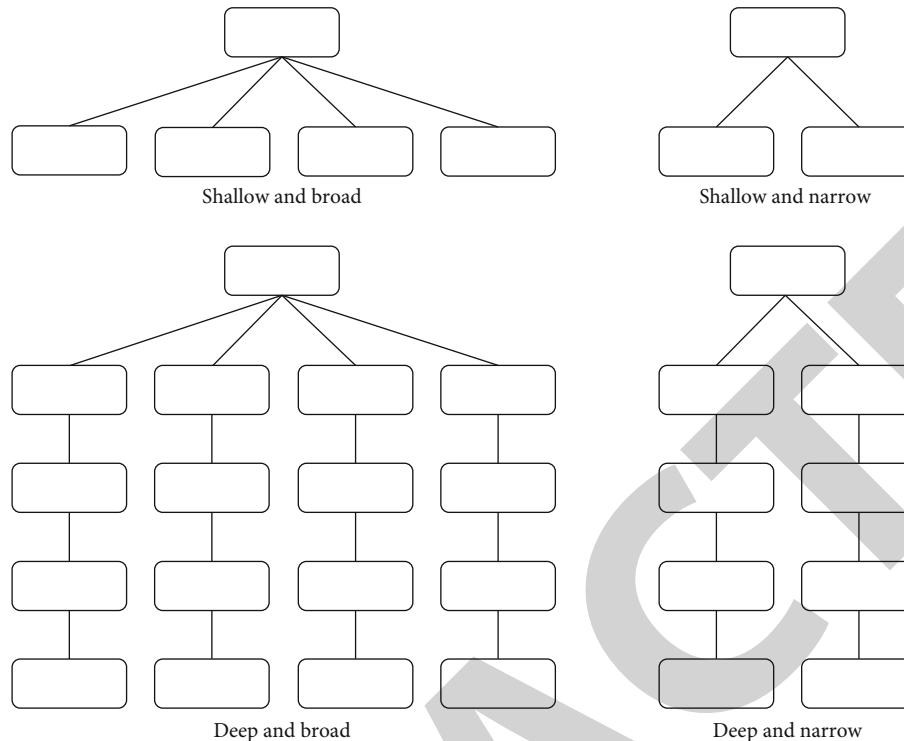Shallow and narrow

Deep and broad

Deep and narrow

Figure 2: Information architecture type.

type through the task structure, and affect the final design style [16]. For example, the menu can provide the corresponding hierarchy, as well as direct access to charts and hierarchical operations. When designing the interface language, it also meets the direct network access mechanism, and then, it is divided into several design steps in the second part to refine each subpackaging step of the design. In the human-computer interaction information display interface, the navigation function needs to be designed to facilitate the selection of jump information and the completion of target tasks. The navigation mode will be affected by the information content, system structure, and hardware facilities to a certain extent.

Based on the information architecture, an interactive information architecture can be formed, including navigation, classification, and organization, and this kind of information architecture will also affect the consulting availability of end users [17]. For the human-computer interface, a good information architecture can meet the needs of users to quickly find the information they need. Figure 2 mainly includes four types of simple operation architectures, which are affected by factors such as screen size, different operation modes, and distance. The content of information architecture will also lead to visual loss of users and inability to find the required information.

Different human-computer interaction interfaces of terminal equipment also have different layout modes, which can be used as a reference for the design of digital TV interaction interface. The layout mode of Jiugongge human-computer interaction interface can bring regular and tidy

visual experience to users and can form a very regular function jump and finally quickly switch to optional content [18].

3.3. Design and Implementation of Digital Media Human-Computer Interaction Interface

3.3.1. System Information Architecture. Figure 3 shows the functional architecture of human-computer interactive digital media interface in this design, including two information architectures: TV terminal and mobile terminal.

In formulating the information framework, it is necessary to comprehensively consider the system functions and combine the characteristics of differentiated terminals. Therefore, the differentiated information architecture is designed this time. Based on the information interaction design rules, the traditional remote control focus jump and the complex secondary page classification content are considered. In order to ensure the design flexibility of the mobile phone system, you can directly switch functions in the label bar and enter the remote control interface.

3.3.2. Grid System Page Layout. In this system page layout design, it is necessary to comprehensively consider the physical size, resolution, and other relevant information of the page; reasonably layout, tile and column; and introduce the grid system into it [19]. As a graphic design style, the design grid system uses the fixed grid to design the overall layout and designs the regular web page layout to form an accurate and readable block. In consideration of the interface
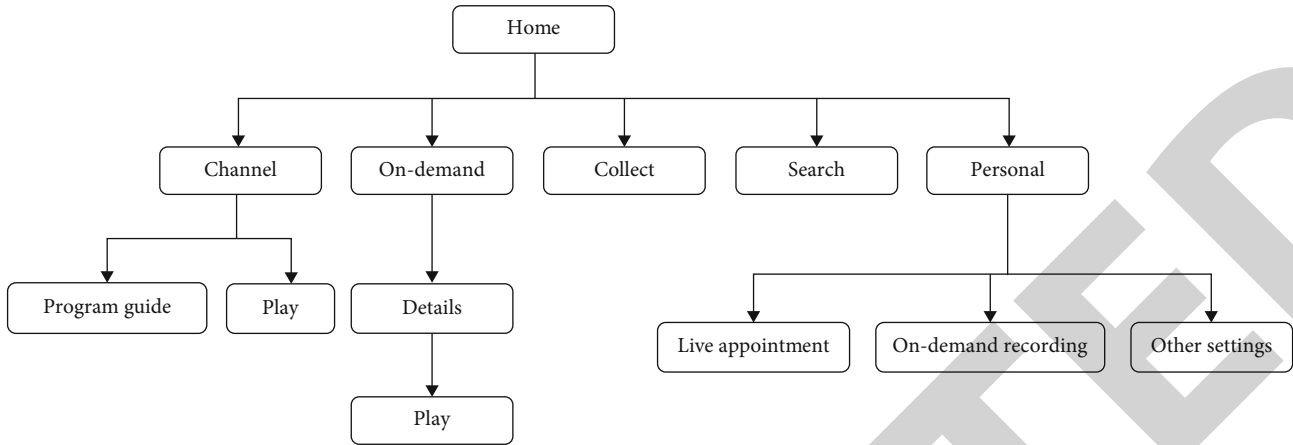
Figure 3: Human computer interface information architecture of digital media.

compatibility of the TV terminal, the system display rate is modified, such as solving the TV replay problem through technology, and the built-in rather than external input of the TV system interface.

3.3.3. Drawing Interface Block Diagram. This design is based on the prototype block diagram and adopts the Axure drawing interface. The software can draw wireframes and generate HTML prototype drawings to complete the demonstration interaction. Take TV as an example to draw wireframe and design page layout when designing information architecture. As a combination of the functions, information, and contents of the system design, the grid system is designed to combine with the differentiated function page, refine the navigation layout, and design two types of layout: regional and column.

3.3.4. Dual Screen Interaction Model. In the use of TV and mobile terminals to watch programs, the interaction process is used to design the information architecture and design the system dual screen interaction. After analyzing the user's prototype operation process, the mobile terminal is used to search the TV channel and push it to the TV terminal. The user can directly make an appointment for late viewable programs through the mobile terminal, so as to make an appointment in advance. In addition, the user can also turn off the TV after watching the TV program and directly use the mobile phone to select the history for dial-up viewing.

3.4. Interactive Visual Design of Digital Media System Interface. When designing the human-computer interaction interface, first of all, it is necessary to determine the visual and color style of the interface. For setting the color, it is necessary to ensure that the digital media system can bring people a pleasant experience and select the yellow border of the media platform based on the dark purple background, so as to achieve the state of highlighting the focus. When designing the overall style of the interface, it is necessary to define the digital media system interface as a flat visual style, focusing on color blocks and lines, so as to achieve a more prominent visual style, which is consistent with the needs of digital TV users. At present, when designing interactive

Table 1: System test environment configuration.

System	Android 9.2
Processor	Qualcomm Snapdragon 845
Memory	8 GB
Network	WiFi/4G
Video protocol	HTTP
Video resolution	1080P

visual style of interactive software, it is necessary to ensure consistent design style as far as possible based on the consistency of different terminal characteristics of mobile phones and TVs. In the design of interface details, PS software is used to draw interface details. Since the interface style is flat visual style, it is necessary to simplify the layout as much as possible, including the system interface composed of pictures and lines. For example, when designing the TV terminal interface, if you want to achieve obvious block and background differentiation effect, you can obtain clearer interface character recognition effect by applying fine projection to the entry text part. In the design background details, the interface background design needs to make targeted shading adjustments for different pages. It is necessary to ensure that the user navigation is concise and intuitive and adopt a clear text description method to realize the text matching with the icon use case, so that the user can quickly think of and perform the corresponding functions while seeing the buttons.

In the process of icon design, based on the iOS 7 system interface, a special linear chart is developed, which is consistent with the system interface style. In order to make it easier for users to operate and identify, the mobile phone icon is drawn. The remote control function icon is designed in Volume I, and the system interface navigation bar is designed in Volume II. In the process of TV terminal design, because the iOS 7 chart lines will have a great impact on the recognition when users watch, it is necessary to redesign the TV terminal icons and draw different styles according to different icons, which can also meet the design needs of users in the process of use. When designing the
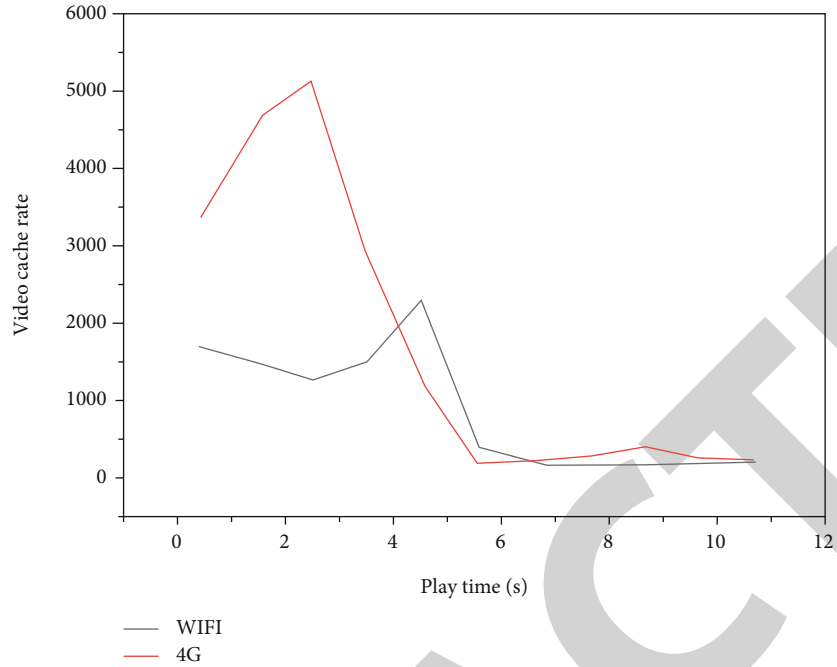
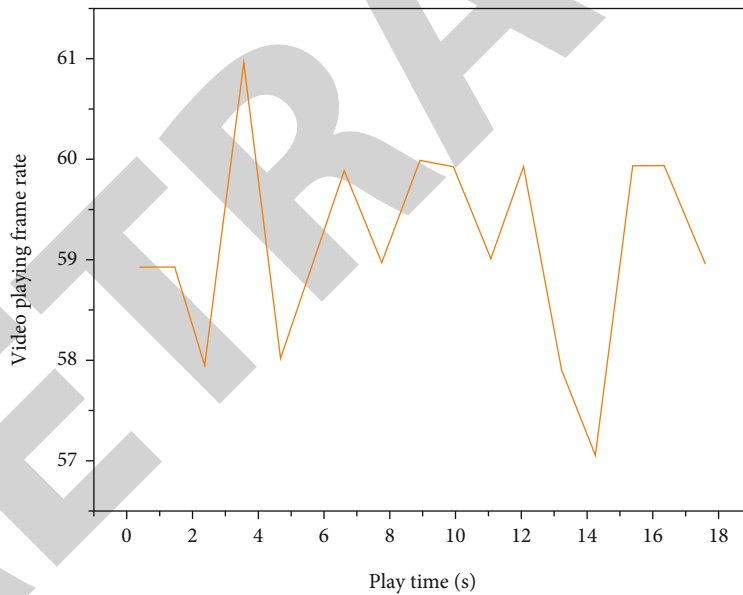Figure 4: Video cache rate in WiFi/4G environment.

Figure 5: Video playback frame rate.

focus status bar, the differentiated focus status of the primary and secondary navigation is designed by selecting the red and white reverse color method, and the same standard is adopted for the mobile terminal and the TV terminal, respectively. The first level navigation selection turns from white to red, and the second level navigation selection turns from white to red. Through this differentiated design, the first and second level navigation can be satisfied. For the mobile terminal, this method should also be used in the focus design process. The upper and lower labels are designed as level 1 and level 2 navigation, respectively, so that the consistency of the status navigation bar interface of the mobile terminal

and the TV terminal can be seen. In addition, for TV, mobile phone, and other terminal operations, it is still necessary to use the direction key for remote control, set the focus box at the focus position, and select the focus position to confirm; then, the subsystem interface in the focus state can be successfully activated.

4. Results and Discussion

4.1. System Test. As the system is applied to VR media, the network fluency during VR playback is the most key indicator. Therefore, the combination test is mainly conducted for
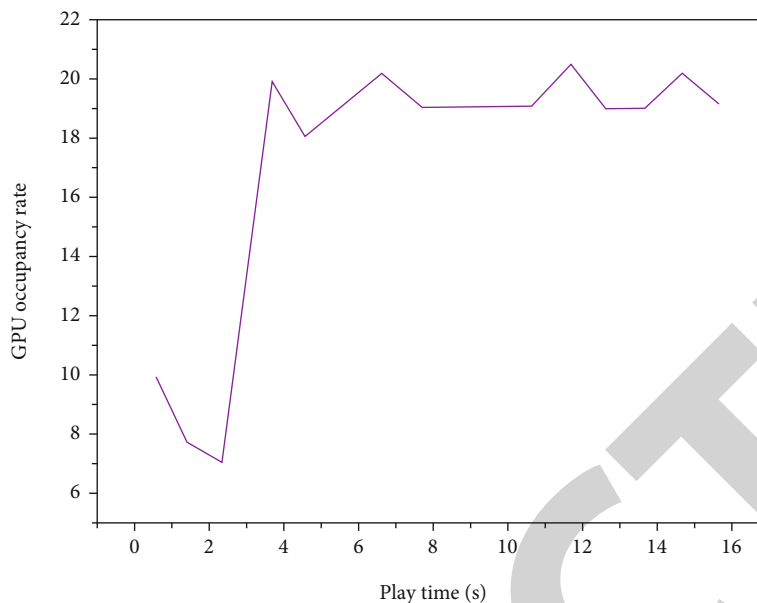
FIGURE 6: GPU occupancy in video playback.

the cache rate and frame rate during the playback process. The configuration of the test environment is shown in Table 1. Write code, output logs in real time, and record test results. Sort out the data obtained from statistics, and take the average value of multiple tests. The specific results are shown in Figures 4–6.

As can be seen from Figure 4, the trend of video cache rate in WiFi and 4G environments is basically the same. The playback start rate is fast and then tends to be stable. As can be seen from Figure 5, the video frame rate is stable at about 60 FPS during playback, which meets the demand of human eyes to watch without jamming. As can be seen from Figure 6, the GPU occupancy rate remains around 20% and stable after playback.

The test shows that under the normal network environment, the system has a stable and good playing effect for VR video streams with ultraclear image quality, basically without jamming, and users can experience high-quality VR effects, which meets the requirements.

5. Conclusion

This paper presents an application method of computer technology in VR digital media. By combining the functional characteristics of digital media, this paper analyzes the necessity of studying the interactive interface of multiscreen interactive digital media. The software data designed in this interface supports users to store locally and upload relevant information to the server successfully during operation. Due to other network speeds and other reasons, local operation is required when it is not convenient for the server to read data, so as to fully enhance the running speed. It not only meets the diversified needs of users when using the interface but also enriches the interactive design content of digital media interface.

Data Availability

The data used to support the findings of this study are available from the corresponding author upon request.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

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