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IMAGE CONSTRUCTION OF NEWS ANCHORS FACING VIRTUAL REALITY IN THE METAVERSE ENVIRONMENT

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Abstract. With the continuous improvement of communication and computing technology, the technical threshold of the Metaverse (MVS) has been lowered, gradually expanding the scope of technology penetration, and attracting attention to the construction of characters in the MVS environment. In virtual reality (VR), character design and scene realizations are the foundation and guarantee of technology application. VR also provides an effective tool for the transformation of traditional media and the exploration of news communication innovation. On this basis, firstly, the introduction of VR is analyzed in the MVS environment. Secondly, based on the application status of VR, the modeling design and structure optimization of three-dimensional (3D) characters in the MVS environment are studied. Furthermore, by improving the traditional 3D modeling process, an adaptive hierarchical detail model is proposed to realize the scene modeling mechanism of the virtual environment combining image modeling and geometric modeling, so as to quickly complete the construction of the character image model of a news anchor in the scene. Finally, the model of the experimental design is simulated and constructed to test the effect of the model to construct the image of news anchors. The results reveal that the frame rate of news anchor images designed by the model can be kept at about 40 frames per second. The actual value of modeling details is always greater than the ideal value of modeling design. By comparing the actual modeling time of the control group and the experimental group, it can be found that the modeling time of the experimental group is shorter. Therefore, it can be concluded that the VR-based hierarchical detail model in the MVS environment designed in this research can better complete the image construction of news anchors. The research results can provide a reference and theoretical basis for the subsequent modeling work in the MVS environment and the construction of VR characters.

Keywords: Metaverse, virtual reality, virtual anchor, image construction, visual architecture

1 INTRODUCTION

A metaverse is an online environment that connects our dreams to reality. It creates a transformed environment where users may have new experiences with their virtual persona by utilizing a variety of already available technology. The prefix "meta-", which suggests transcending, is combined with the word "universe" to form the phrase "metaverse" [1]. Connecting the virtual space with the physical world in the MVS environment, including the network, hardware terminals, and users, will have a profound impact and change on the economy, culture, education, and lifestyle of the future society [2]. Virtual reality (VR) is regarded as an essential technology that offers the potential for a significant advancement in several industries. Virtual reality, often known as immersive multimedia, is a computer-simulated environment that can simulate physical presence in locations in the real world or made-up worlds. The widely used Virtual Reality (VR) technology is the advanced version of visual VR technology and Augmented Reality (AR) technology, which is the primary form of MVS. The usage of virtual reality (VR) and augmented reality (AR) headsets allows for the hypothetical creation of the "metaverse", which is the Internet as a single, all-encompassing, and immersive virtual environment. Designers will have the ability to create and share our own surroundings and experiences thanks to the metaverse. One important phase in the creation of large-scale applications is the metaverse, a virtual environment made by people with digital technology. It enables users to engage in virtual and physical spaces, akin to settings seen in phygital reality. Platforms such as Second Life, Horizon Worlds, Roblox, Mesh for Teams, and HoloBoard demonstrate the promise of the metaverse, which will open up new avenues for human conversation and marketing [3]. With the innovative technology known as the Metaverse, individuals may interact with both virtual and actual worlds. It is the result of these technologies and has no participation limits or transit expenses. Researchers from a variety of fields have been drawn to this feature, which has allowed them to contribute to their respective fields and study areas. Through events and classes, the Metaverse may instruct a variety of target audiences from any location in the globe [4]. Virtual Environments (VEs) and Virtual Reality (VR) may greatly enhance the results of building projects. Virtual reality approaches improve productivity and efficacy throughout the whole project lifecycle, from initial concept to finished construction. This 3D interactive environment reduces modifications, enhances constructability, and boosts comprehension of the design concept. Virtual walkthroughs that never end provide experiences close to reality. It addresses the gear and software utilized, VR technology, and the industry's effective acceptance of VR in building [5]. With the worldwide platform project Metaverse giving a fictitious virtual environment, platformization is revolutionizing urban life. It is capable of improving urban efficiency and is powered by AI, Big Data, IoT, and Digital Twins. Nonetheless, issues related to ethics, people, society, and culture still exist. Reviewing the goods and services offered by the Metaverse, this study emphasizes sustainability, social, economic, and environmental objectives. It evaluates this techno-urban vision's advantages and disadvantages and assists urban policymakers in understanding its ramifications [6]. It is released on October 20, 2021, the National Radio and Television Administration (NRTA), "The 14$^{\text{th}}$ Five-Year Plan for the development of radio, television, and Internet audiovisual technology". It indicated that the technology upgrade of the production and broadcasting system should be accelerated. It investigates the emergence of virtual anchors in the live broadcast sector, looking at approaches to profitability, relationships to the Metaverse, and operational models. Though it also draws attention to issues like authenticity and in-the-moment engagement, it also emphasizes the advantages of continuous live streaming. Verifying user privacy and authenticity is essential to integrating virtual live broadcasting with the Metaverse, which enables increased audience engagement and a variety of income sources [7]. Researchers investigate the metaverse, a virtual reality environment intended to facilitate daily activities, employment, and leisure. It looks at how virtual world generating techniques, such as 3D world generation, immersive HCI, and ecology, have developed and the difficulties they face. Along with reviewing these technologies, it also covers the demand side of the metaverse in virtual-reality interpromotion, massive data processing, and low-latency networking. Other technologies covered include motion capture, extended reality, and brain-computer interface [8]. Moreover, the construction of virtual news anchors is also less explored. Thus, in the context of the MVS environment, the image construction of news anchors based on VR is studied to provide a reference and theoretical basis for the subsequent construction of virtual news anchors and research on virtual anchors.

2 RELEVANT THEORETICAL BASIS AND MODEL CONSTRUCTION

2.1 Analysis of MVS Environment

MVS is a parallel world built by people, and it will evolve. Some scholars believe that MVS is divided into four levels. The first level is a sensory simulation, which makes people's senses simulate the same feeling as the real world in the virtual environment. The second level is neural intervention, which is connected to the body through chips and computers to change the organic structure of the body. The third level is consciousness uploading, which extracts people's ideology into the world constructed by computers. The fourth level is the cosmic dimension enhancement, which is still a philosophical question with the current state of technology. The four levels of the metaverse are covered in details are as follows:

Level 1: VR Headsets plus Web 3.0;

Level 2: Full Body VR plus Full Web and DAOs;

Level 3: Advanced VR Neurotech;

Level 4: Metaverse and Real World Become Indissociable.

MVS system enables a consumer to select the functions they require while excluding the rest. In reality, they compare the possibilities of real-time multisensory social interactions (RMSIs) on the 2D internet with those in the computer-mediated metaverse. Through the application of theoretical reasoning and field-experimental probes, a paradigm for comprehending how RMSIs impact interaction outcomes in the metaverse is developed. The framework highlights important commercial domains and social issues and acts as a guide for further study [9].

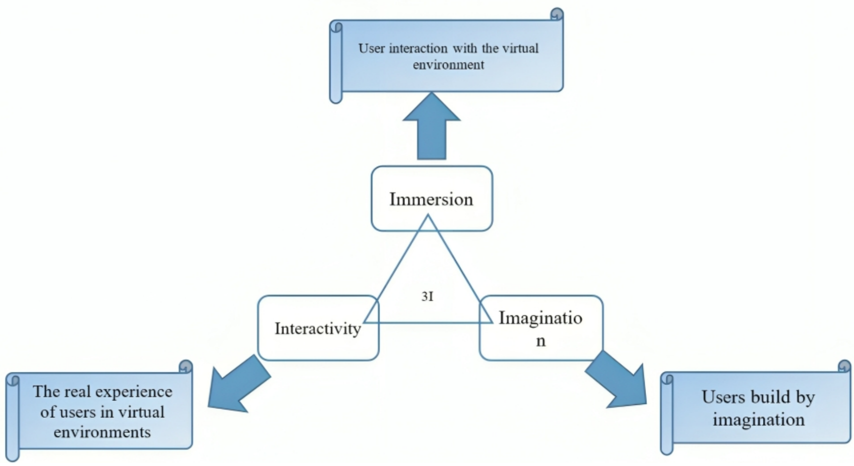


Figure 1. Feature diagram of 3I of VR

Some studies believed that the construction of the digital world and the establishment of sensory simulation system lay the foundation of MVS, as shown in Figure 1. In other words, vision, hearing, smell, taste, touch, balance, hunger, fatigue, and consciousness formed by various human senses (eye, ear, nose, tongue, skin, heart, brain, etc.) can get the same feeling as the real world in the computer-built virtual world [10]. With the constant growth of VR, AR, and Mixed Reality (MR) technologies that people are familiar with, especially the promotion and rapid progress of MR technology, people have reached the edge of the primary level of

MVS, and the MVS environment has started [11]. Mixed reality (MR) creates new simulated settings and images where physical and digital items interact in real time by fusing real and virtual entities. It combines virtual reality and augmented reality in a hybrid way. It focuses the attention of the audience and enables total immersion. A framework for creating and examining visuals in the metaverse – a visual environment that combines the real and virtual worlds is offered. Three visual elements, two approaches to graphical building, interaction technologies, and visualization methodologies are introduced. The study looks at possible uses and directions for metaverse research in the future [12]. According to a research, water resources education can be improved by using a 3D virtual reality architecture in the metaverse (VRAM). To engage with multimedia content, participants donned VRAM helmets, and their portfolios were kept in a cloud database. The notions of environmental conservation, motivation, interaction, and self-efficacy were significantly improved, according to the results [13].

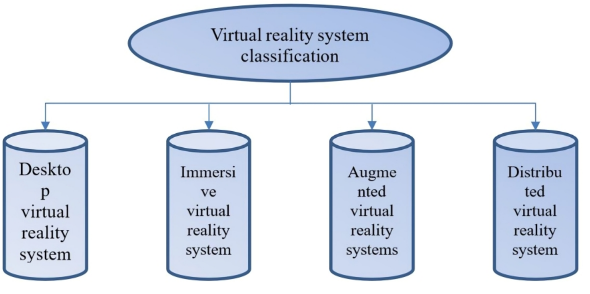


Figure 2. The classification results of the VR system

Technological progress must promote the change of media, and the variation of media determines the change of communication mode. Compared with traditional social media, MVS social media has more flexible and broad innovative thinking in the construction method of virtual subjects. The images of the virtual subject in traditional social media are mostly constructed by three forms of text, picture, and a combination of the two, such as nickname, personal signature, mental state, profile picture, photo wall, and moments. With the Internet, people can educate themselves about topics with which they may be unfamiliar. Making a significant impact on social change can be accomplished through performing random acts of kindness, giving back to the community, and developing a mission. The construction of the virtual subject image in MVS social media enables users to feel each other's latest status in real time, thus reducing the sense of distance in interpersonal communication [14]. Compared with traditional social media, meta-users can change their own virtual subject image through a "mirror", which differs greatly in color, style, shape, and size [15]. Users not only enjoy a large choice of model space but also can enrich their virtual image through a variety of special effects, and even can rebuild themselves by copying other users' virtual images. Animations are used to provide an image with a range of special effects. That is by showing the viewer images which appear to be difficult to obtain in reality or which emphasize specific elements of a scene above and beyond those conceivable by conventional imaging images. In addition, users can also enjoy their virtual subject image by taking selfies or taking pictures together [16]. In general, the construction of virtual subject images of MVS media not only achieved an innovative breakthrough in methodology but also more stereoscopic, diversified, and dynamic in the form of content.

2.2 Analysis of VR Technology in the Background of MVS

VR technology is the use of computers, combining virtual images with the reality of the perception. From a theoretical point of view, VR is an applied computer simulation system, which can show the real world in the way of a virtual presentation and simulate the application environment under the effect of computer software, so that users can be completely immersed in the environment [17]. Since all images are not directly seen by the human eye but are virtual worlds that exist in the real environment through computer simulation, they are called VR [18].

The outstanding feature of VR technology is that computer technology produces an artificial three-dimensional (3D) virtual environment. This environment is to adopt computer technology to build 3D space, or copy the real environment into the computer to create a realistic "virtual environment", and finally make users feel immersed in the virtual world under the premise of multiple senses [19]. A technology called immersive virtual reality attempts to entirely submerge the users into the computer-generated world, giving them the sensation that they have "stepped inside" the artificial world. Either numerous projections or technology such as Head-Mounted Displays (HMD) are used to accomplish this. The characteristics of imagination, immersion, and interaction (3I) of VR are displayed in Figure 1:

1. The interactive technology in VR refers to the interaction between the user and the virtual world in a natural way. VR technology is not only a simple simulation of the surrounding environment, but more importantly, users can interact with the simulated virtual space. In a virtual reality (VR) environment, the user has autonomy over the simulated setting. By utilizing sensors, screens, and additional capabilities like motion tracking and movement tracking, VR improves a fictitious environment. Holding and moving 3D items in VR space allows the user to interact with them.
2. The sense of reality obtained by empirical users as protagonists in the virtual environment is immersion, which has always been recognized as an important measure to measure the performance of VR systems, that is, to change experiential users from observers to participants.
3. Imagination means the use of imagination to create surreal virtual environments. VR 3D modeling is the process of using VR technology to create a 3D model of an object or design, employing controllers with six degrees of freedom (DoF)

rather than a flat screen and a mouse and keyboard. When users are placed in a virtual environment, they can obtain a variety of information and carry out human-computer interaction (HCI) with the running state of the system.

At the same time, through a series of thinking processes such as association, logical judgment, and reasoning, people can give full play to the space of imagination and finally build a surreal virtual environment. The classification of the VR system is denoted in Figure 2.

Various types of VR systems can be divided into the desktop, immersive, augmented, and distributed by taking the forms of user participation and degree of immersion as classification criteria. AR enhances a real-world scene, while VR provides an immersive virtual experience. While just 25 % of AR is virtual, VR is 75 % virtual. Unlike AR, VR requires a headgear device. While AR users interact with the real world, VR users navigate through a wholly imaginary environment [20].

The application purpose of VR is to use computer technology to reconstruct the virtual world, which requires that the constructed world must maintain the same form of existence as the original world, and provide users with relatively perfect interactive use capability. For the 3D modeling of news anchor images, VR technology pays attention to the collection of features of anchor images and requires that it must be consistent with the actual design ideas in the restoration environment. Users of VR systems should feel as though they are living in a virtual environment. Virtual reality is an environment that is completely immersive and affects a person's senses of sight, sound, touch, and smell. With a virtual reality system, users interact with a virtual environment using devices like head-mounted video displays, surround sound headphones, and hand controllers.

$s(x)$ is defined as the selected modeling transformation function and the ideal anchor image is collected specifically in the real design environment. The specific collection principle is as follows:

$$D_u = s(u). \tag{1}$$

In Equation (1), u is the set of images in the realistic design environment. Based on VR technology, D_u stands for the collected 3D modeling data of the characters.

For the convenience of data transmission, transformation functions are defined to deform the data, as illustrated in Equation (2):

$$D_1 = T_u\left(D_u\right). \tag{2}$$

D_1 refers to 3D modeling data after the transformation.

In view of the data to parse, the 3D analytic function is defined, which can express the 3D modeling data after analysis, as revealed in Equation (3):

$$D_2 = T\left(D_1\right). \tag{3}$$

A virtual modeling function is defined. Y represents the virtual scene after modeling, then it can be expressed as Equation (4):

$$Y = E\left(D_2\right). \tag{4}$$

To sum up, virtual scene Y of the news anchor after modeling can be written as Equation (5):

$$Y = E\left(T\left(T_u(s(u))\right)\right). \tag{5}$$

2.3 3D Scene Modeling Based on Geometric Rendering Method

3D models with regular shapes in 3D scenes, such as tall buildings and gates, can be built through basic geometry such as cuboids, cones, and spheres, namely 3D base modeling. 3D Studio Max (3ds Max) provides two basic modeling methods: standard primitives and extended primitives. For 3ds Max, there is a group of sophisticated primitives called Extended Primitives. Although 3ds Max offers a set of extended primitives on stead of standard primitives. For use in gaming, cinema and television, 3ds Max is used to create, animate, and render complex scenes, lifelike designs, and detailed 3D characters. Primitive, polygon, non-uniform rational basis spline and rational basis spline are the four primary approaches to 3D modeling. Due to the small number of faces in the primitives, the triangle faces in the field of view of the camera will be greatly reduced in the later virtual scene synthesis, which not only ensures the drawing quality of the graphics but also greatly improves the drawing speed of the graphics. Therefore, in 3D modeling, the primitives are used as much as possible.

After the completion of base modeling, it is necessary to assign various materials to the model to show their different surface characteristics, so that the authenticity of the virtual scene can be better reflected. In 3ds Max, material spheres are mainly used to give materials to the basic model. After the photos taken by the digital camera are processed in Photoshop, material spheres in the project are added. The UVW map modifier is applied to expand the map for parameter setting, which makes the 3D basic model more vivid and realistic. The UVW Map modifier regulates the appearance of mapped and procedural materials on an object's surface by applying mapping coordinates to an item. Coordinates for mapping define how bitmaps are applied to an object. Figure 3 demonstrates the effect sketch of the 3D base modeling of the park gate made by 3ds Max.

2.4 Character Modeling and Bip Skeleton Rigging

2.4.1 Bip Skeleton Rigging

3ds Max has a set of convenient and fast human skeleton tools in bip, which can quickly complete the design and production of human body animation in the virtual scene.

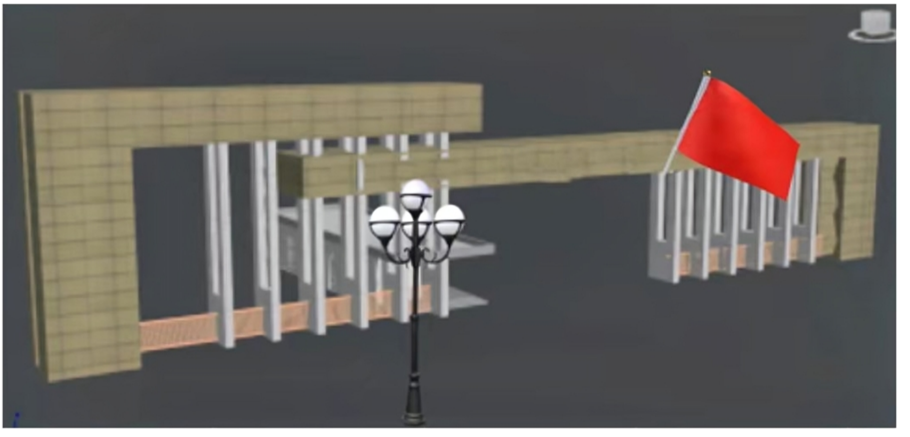


Figure 3. A rendering of the 3D base model

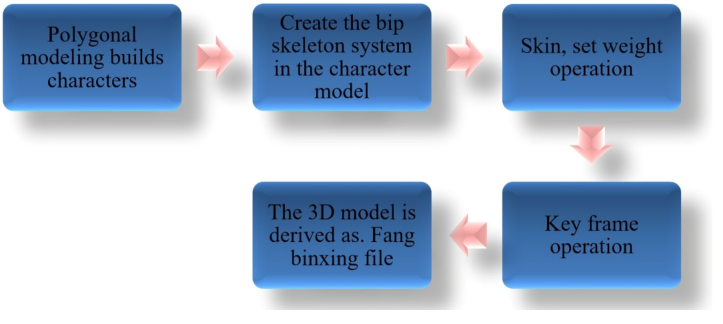


Figure 4. Steps of modeling diagram

In Figure 4, the steps of skeleton modeling with the bip tool are exhibited. Firstly, the static character model is built by polygon modeling. A characteristic of top-down design in which a model establishes and clarifies design intent and product structure from the start of the design process. Polygonal modeling is a technique for representing or roughly simulating an object's surfaces using polygon meshes. Secondly, the skeleton system of bip is created in the character model. By adjusting the panel parameters and controlling the number and shape of the skeleton of the bip, different skeleton effects in the bip can be obtained. At the same time, through skinning and weight painting operations, the goal of the skeleton drive model to produce reasonable movement can be achieved. The process of skinning involves attaching the real 3D mesh to the joint arrangement you made. As a result, the vertices of your model will move in accordance with the joints you set up. Finally, the key frame operation is employed to carry out skeleton movement (such as walking, running, and other actions) at key nodes to complete the production of character animation. In this section, 3D base modeling and animation of some characters will be completed, and the 3D model will be exported as Flash PiX (FBX) file to prepare for the later virtual scene synthesis and character roaming. Making three-dimensional representations of an object or a surface is known as 3D modeling. In computer-based 3D modeling software, 3D models are created.

2.4.2 Character Modeling

The free version of iClone5.4 is selected to complete the rapid and efficient production of character models and character animations in VR, and the details of the character's shape and face are well reflected.

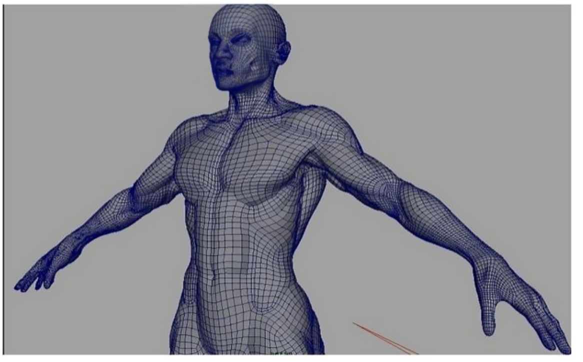
First, the corresponding materials are selected in the material library according to the appearance and shape of the 3D character and imported into the iClone project, to modify the body or a single part of the character. With the function of free deformation and high-precision manual slider, the human face is made to further refine the character. Second, the skin details are adjusted by giving different textures, and setting detailed parameters such as wrinkles. Third, the character is dressed in a full set of clothes using the multi-layer dressing method, and the fitting tool is adopted to further fine-tune the structure and design the personal character model. Modeling results are signified in Figure 5.

2.5 Generation Method of the Levels of Detail (LOD) Model

The core idea of LOD is to call models of different complexity according to the distance between the camera and the 3D model in the virtual scene. In a nutshell, when a 3D model is far away from the camera, a rough model is used, otherwise, a high-precision model is adopted. At present, static and dynamic LOD technology are generation methods of two basic LOD models. The detailed classification method is demonstrated in Figure 6.

Static LOD technology is to build a set of simplified models with diverse precision for the same 3D model by the pointer in advance. By establishing conventions, simplified models with different precision can be called according to the changes in the visual distance of the 3D model. Figure 6 b) presents the static LOD model. Dynamic LOD technology means that the simplified model of each level is generated by the refined model of the previous level through a simplified algorithm based on vertex, edge, or face collapsing. There are three simplified algorithms for the dynamic LOD model, which are based on the edge, vertex, and face collapsing.

The simplified algorithm based on vertex collapsing has the lowest complexity and the fastest rendering time. The face-collapsing algorithm uses an envelope to control the error. The 3D model is wrapped with inner and outer envelopes, and the model is simplified between the two envelopes. Although the envelope can control the simplification error well, the calculation amount is too large and the rendering

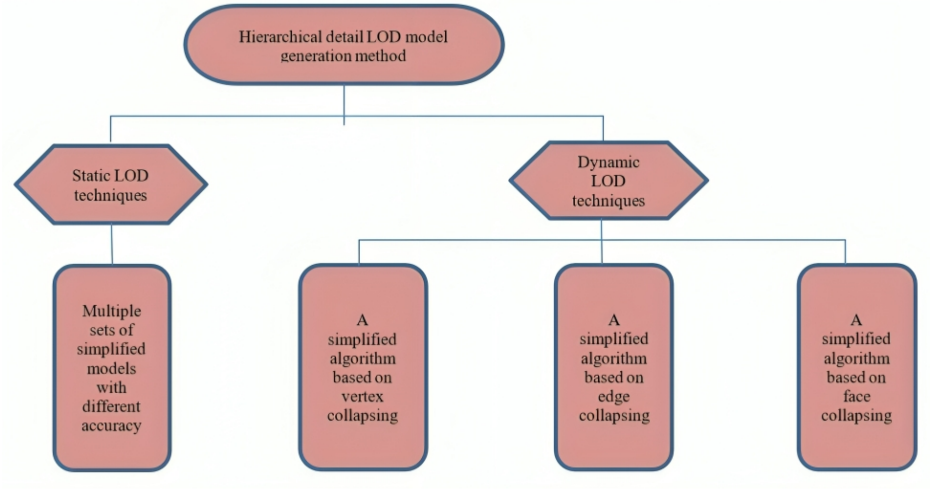


a) Preliminary modeling diagram

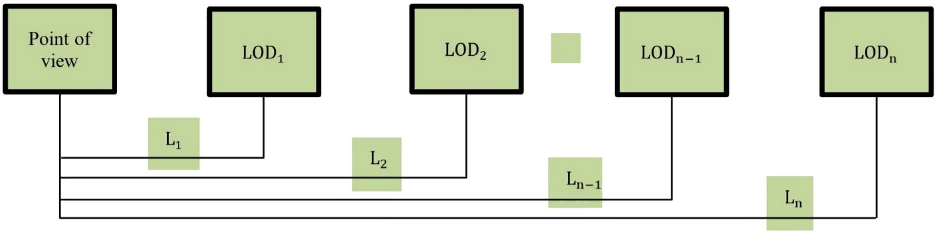
b) Modeling result diagram

Figure 5. Modeling result diagram

time is long. The diversity of discrepancies between simple and sophisticated model predictions is that simplification mistake is expressed. Then, the size of the image, the resolution, the render quality settings, the lighting, complicated materials and more can all effect how long it takes to generate an image. Considering rendering time and simplified distortion, the edge collapse is not easy to distort, can maintain the shape of the original 3D model well, and the rendering time of the model is short. Therefore, in the process of generating LOD models for large-scale complex virtual scenes, the edge collapse has more advantages. Consequently, this research selects the edge collapse to model LOD.



a) Classification detail



b) Static LOD details

Figure 6. Classification results of LOD model

The quadratic error measure of the edge collapse V is defined as the sum of the squares of the distances from V to the set $p(v)$ of its corresponding triangular plane:

$$\Delta(v) = \Delta\left([v_x, v_y, v_z, 1]^T\right) = \sum_{p \in \text{plane}(v)} V^T (K_p)\, v, \tag{6}$$

$$\Delta(v) = V^T \left\{ \sum_{p \in \text{plane}(v)} K_p \right\} v = V^T Q v. \tag{7}$$

Q is the quadratic error measurement matrix of vertices, which determines whether an edge can be reduced by collapsing, as follows.

The generation mechanism of the designed adaptive model based on the edge collapse is expressed in Figure 7.

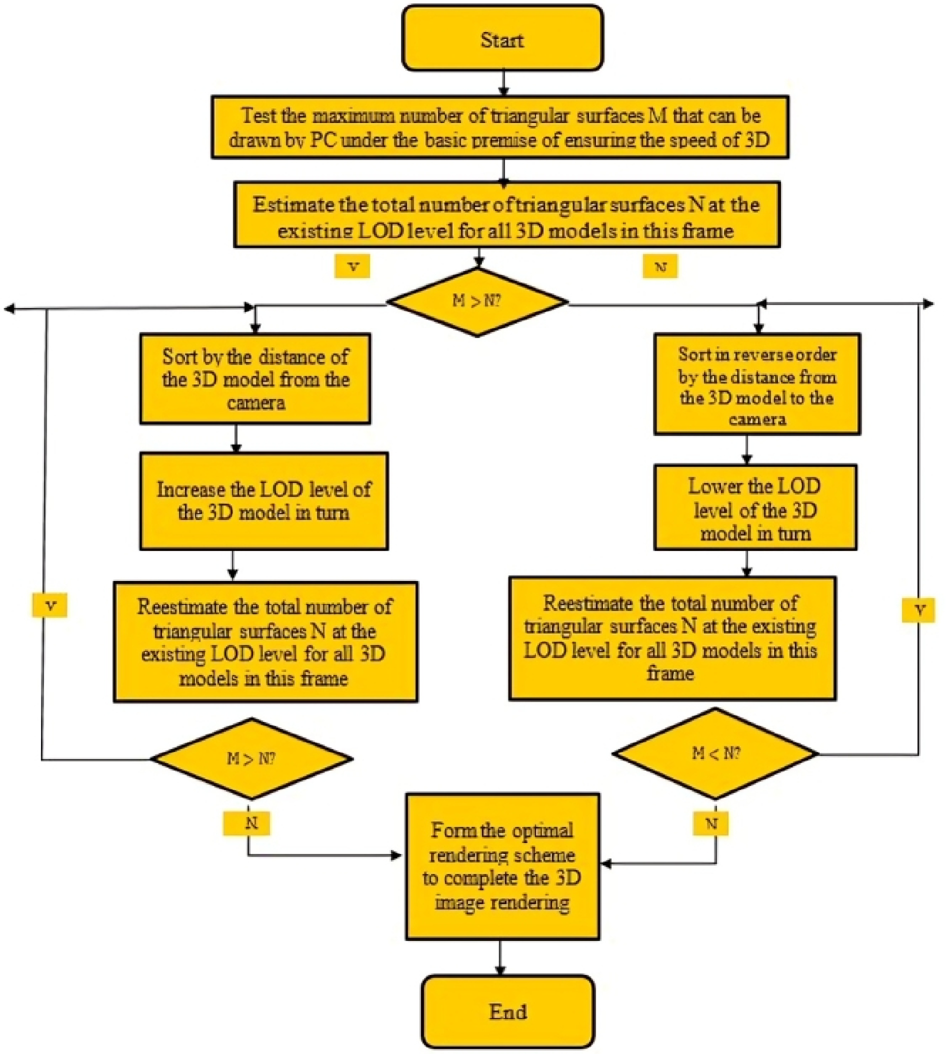


Figure 7. Generation mechanism algorithm of adaptive models

First, the maximum number of triangle faces M that can be drawn by the client PC under the basic premise of ensuring the speed of 3D graphics drawing is tested. Second, the total number of triangle faces N of all 3D models in this frame is estimated at the existing LOD level. If it is less than the maximum M that can be drawn by a PC, the LOD level of the 3D model is successively increased by a simplified algorithm based on edge collapse according to the distance between the 3D model and the camera. If $N > M$, the LOD level of the 3D model is reduced in turn by the same algorithm according to the above distance until $N < M$. The appropriate LOD level is selected adaptively for each 3D model through the estimation, thus forming the optimal modeling scheme.

3 RESEARCH RESULTS AND ANALYSIS

3.1 Model Triangle Faces and Frame Rate Analysis

To prove the effectiveness of the generation method of the proposed adaptive LOD model based on the estimation of triangle faces, the method is applied to the park roaming project on the basis of Unity3D. The issue of discontinuity in various subdivision levels is resolved by building an adaptable LOD model of the DEM data blocks; the number of triangles in this adaptive LOD model significantly lowers as their error tolerances increase, but there is no discernible change in the outcomes. By setting a fixed path, the protagonist is controlled to roam in the virtual scene, and the number of triangle faces in the camera field is calculated by using GetComponentsInChildren⟨MeshFilter⟩ in Unity3D API. At the same time, the triangle faces and frame rate data obtained by StreamWriter are read into the TXT document, and test data on the number of triangle faces and frame rate are obtained, as outlined in Table 1.

Number of Triangle Faces	Frame Rate	Number of Triangle Faces	Frame Rate
350 125	71	501 524	62
782 662	55	201 545	98
412 752	62	712 945	58
917 782	58	892 396	45
724 578	40	941 563	90

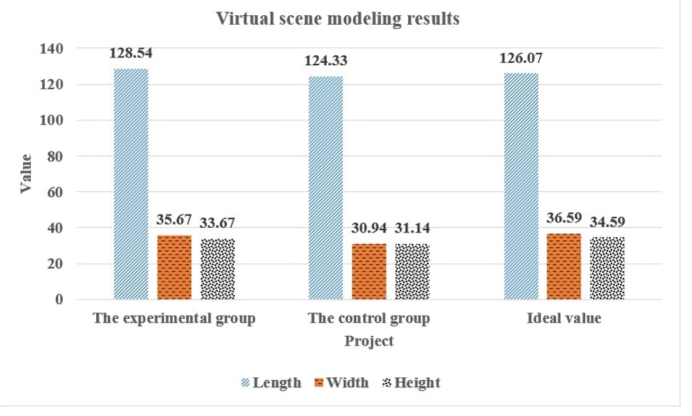
Table 1. The number of triangle faces and the frame rate result

Table 1 signifies that according to the test data, the 3D frame rate of the virtual scene can be kept above 40 frames, and the real-time performance of the system is well guaranteed. The 3D model in the scene better maintains the characteristics of the model. The render speed and effect of the scene are optimal without affecting the response of the system to other functions.

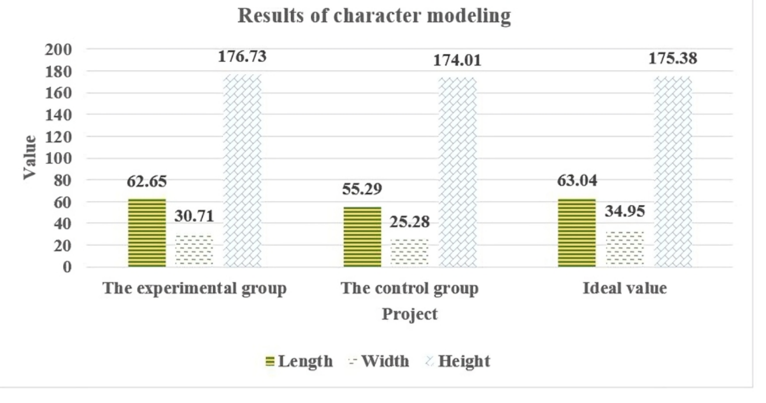
3.2 Modeling Situation Analysis

In this experiment, 3D models based on VR technology and Computer Aided Three-dimensional Interactive Application (CATIA) method are used for modeling. The application is much more than just a CAD (Computer Aided Design) program.

This comprehensive software package includes CAD, CAE (Computer-Aided Engineering), and CAM (Computer-Aided Manufacture). The models based on VR technology are the experimental group, and the models based on the CATIA method are the control group. The structural modeling data of the two groups are recorded and compared with the ideal values, as portrayed in Figure 8.



a) Modeling results of the virtual scene



b) Character modeling results

The value of the experimental group is always greater than the ideal value, which reserves certain space for model errors in the process of implementing the image design of news anchors in the later stage, and can effectively ensure the accuracy of the image modeling of news anchors. The value of the control group is not only always less than the ideal value, but also the difference result is always greater than that of the experimental group, which is easy to affect the accuracy of modeling due to errors in the later design process of the news anchor image.

c) LOD modeling results

Figure 8. Schematic diagram of the results of the comparison experiment

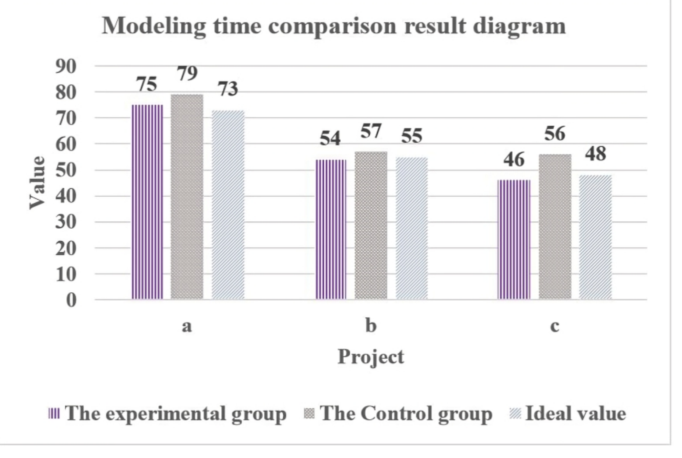


Figure 9. Experimental results of modeling duration comparison

3.3 Modeling Duration Analysis

The actual consumption time required by the experimental group and the control group during the implementation of modeling of virtual scenes, characters, and LOD modeling are analyzed respectively, and the results are plotted in Figure 9. Due to the different degrees of modeling difficulty, the modeling time of the virtual scene structure is the longest, while that of the LOD structure is the shortest. By comparing the modeling time and the ideal time of the experimental group, it is found that the maximum difference between the two is 2 s, while the maximum difference between the ideal time and the modeling time of the control group is 8 s, which is higher than that of the experimental group.

4 CONCLUSION

The new social media in the MVS environment has completed the triple construction of interpersonal communication in the aspects of communication subject, field, and behavior. Compared with the traditional media, the multi-dimensional construction of the virtual subject image in the new media under the MVS environment has achieved an innovative breakthrough in methodology. Furthermore, VR technology has become one of the hot issues in today's research. Based on this, in the context of MVS environment, VR technology is employed to study the image construction of news anchors. Firstly, the current status of the MVS environment and the characteristics of MVS media are analyzed. Secondly, VR technology is studied, and the appropriate VR modeling technology is selected. Thirdly, the steps of VR modeling are explored in the aspects of character, scene, and LOD modeling. Finally, simulation experiments are conducted to verify the experimental modeling. According to the experimental results, the virtual scene constructed by the news anchor image construction method designed in this research can be stably maintained at a frame rate 40 frames per second, which is easy to spread. Meanwhile, the modeling time is shorter than the traditional method, and the modeling effect of the designed model has a certain error space, which can ensure the accuracy and flexibility of the final results. The research findings can provide a reference for the subsequent image construction of news anchors and afford a theoretical basis for the updating of the virtual image generation model. Due to the short research time and a limited number of samples, the scope and depth of the investigation here have certain deficiencies. The sample size is small and the representativeness of the experimental results is not great. The scope of the investigation will be expanded for further research. At the same time, the exploration of VR technology keeps pace with the times, and the new technology will be updated and used in the future, and the theory and practice will be deeply combined to conduct a further in-depth study.

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