

Original Paper

Design of Virtual Anchor Based on 3Dmax

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Abstract

With the rapid development of virtual reality and live streaming technologies, virtual anchors have become increasingly popular in recent years. In this paper, we propose a design method of virtual anchors based on 3DMAX. Through the use of modeling, rigging, and animation techniques, virtual anchors with realistic appearances and human-like movements can be created. We also explore the application of machine learning technologies in improving the interaction between virtual anchors and users. In addition, we provide a case study on the design and implementation of a virtual anchor for a popular live streaming platform. Our results show that the use of 3DMAX in virtual anchor design can greatly enhance user engagement and improve the overall user experience. Virtual anchor design technology based on 3DMAX is a highly complex design work, which requires designers to have a variety of skills and creative capabilities, and needs to fully consider the needs of the audience and the development trend of the industry. Designers should also have certain cultural accumulation and creative ability, and be able to design an attractive and valuable virtual anchor image from the perspective of the audience. This paper analyzes the production and design of the current virtual anchors, in order to provide some reference significance for the production, operation and commercial realization of the virtual anchors in the future.

Keywords

virtual anchor, 3DMAX, modeling, live streaming

1. Introduction

1.1 Research Background and Significance

With the continuous development of science and technology, virtual anchor has gradually become a new industry. Virtual anchor refers to a form of virtualizing characters through 3D technology to perform, interact and spread on network platforms. Virtual anchors not only cover the functions of traditional anchors, but also can show more colorful personality, image and interactive forms, which has become a hot topic in the current Internet entertainment and media industry.

The emergence of virtual anchors reflects the development level and innovation ability of China's entertainment and media industry. The emergence of virtual anchors can provide users with more diversified and personalized entertainment and communication services, and can also bring broader development space and business opportunities for the entertainment and media industry. Therefore, an in-depth study of the design method and technology application of the virtual anchor industry is of great significance to promote the development of China's entertainment and media industry and enhance the core competitiveness of the industry.

Virtual anchors, also known as virtual influencers or virtual streamers, are computer-generated characters that act as hosts in live streaming platforms. As AI technologies continue to develop, virtual anchors have become increasingly popular among users. They offer a unique user experience and can attract a large following due to their visually stunning appearances and entertaining personalities. However, the design of virtual anchors requires advanced computer graphics techniques and complex animation skills.

In this paper, we propose a method for designing virtual anchors using 3DMAX, a 3D modeling and animation software. We also explore the integration of machine learning to enhance the interaction between virtual anchors and users.

1.2 Literature Review

A lot of exploration and practice have been carried out on the research of virtual anchors China and abroad. In 2002, Thomas Rist introduced the Intellimedia field at the Pacific Rim AI International Conference, believing that the field is at the intersection of multimedia systems and AI research, and will be the future trend. (Rist, 2002). Jinming Zhan and Nan Zhang (Jinming Zhan & Nan Zhang, 2023) think the new form of reward "Superchat", which is born with the development of Virtual anchors, has not been studied yet. He Zhiqing (Zhiqing H, 2023) analyzes why domestic virtual anchors can rise rapidly in the field of live broadcasting from the aspects of image design, technology application, fan psychology, crossover and so on. In 2018, Brazilian scholar de Araujo L V proposed that the media research on artificial intelligence in Brazil is rare, especially the empirical research on evaluating their applicability in news production. In the paper, the scenarios and the possibility of using algorithms and NLG in Brazilian media companies are investigated through interviews, and the results show that

doubts and doubts about these technologies still exist. Cobos-Guzman S and others have designed a virtual assistant to improve the communication between presenter and audience. And they believe that this virtual assistant should be able to automatically determine the attention of the audience from audio-visual resources (Cobos-guzman S., Nuere S., Álvarez L., et al., 2021).

1.3 Study Content and Methods

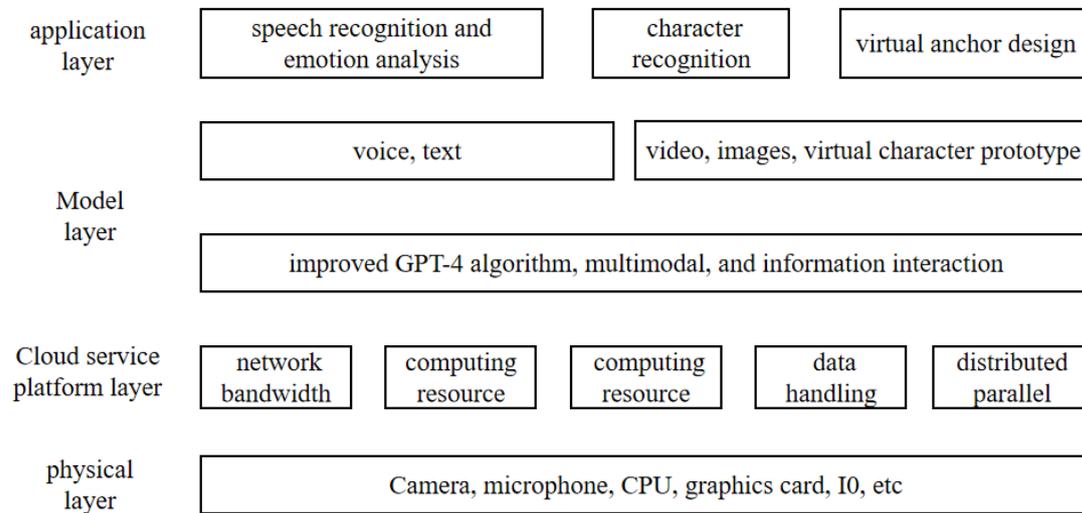
The research content of this paper is based on the design of virtual anchors under 3Dmax, the structure of this study is mainly divided into three parts: create virtual anchors, design action process and analysis practical effect. But the outcome of the previous research still has the gap in how to add realistic appearances and movements, therefore the purpose of this study focused on the basis of exploring design methods and technology application, in-depth research will be conducted from three aspects: image positioning, action design and expressive innovation.

The research methodology used in this paper is a multidisciplinary comprehensive and practical research. First of all, the existing virtual anchor industry practice is analyzed, and its successful design elements and methods are explored. Secondly, with the help of 3DMAX and other design software, the virtual anchor image, action and expression design. Finally, the design results were tested and evaluated, and the experience of design methods and technology application was summarized.

2. Methodology

Our method consists of three main steps: modeling, rigging, and animation. Using 3DMAX (3DMAX is a powerful 3D modeling and animation production software with a wide range of applications. In addition to frame-by-frame animation, material mapping, and lighting shading, 3DMAX also supports a variety of particle effects production, post-synthesis, and 3D printout, making it one of the most important tools in the 3D industry.), we create a 3D model of the virtual anchor based on reference images and sketches, ensuring a visually appealing appearance. We then rig the model with a skeleton or bone structure, enabling it to be animated. The animation is created using 3DMAX's tools, incorporating keyframe animation and motion capture data for smooth and lifelike movements. We also implement a natural language processing algorithm to improve user interaction.

In our proposed method, we use Natural language processing, Computer vision, Speech synthesis Human-computer interaction technology, Emotion recognition technology to create virtual anchors with realistic appearances and movements. The process consists of three main steps: modeling, rigging, and animation. See Table 1:



Modeling: We start by creating a 3D model of the virtual anchor using 3DMAX. We use natural language processing, computer vision and speech synthesis to design the character's appearance, including its facial features, hairstyle, clothing and sound style. We also create the character's body structure and proportions to ensure that it looks realistic and visually appealing.

Rigging: Once the 3D model is complete, we proceed to rig it. Rigging is the process of adding a skeleton or bone structure to the model, which allows it to be animated. We use 3DMAX's built-in rigging tools to create a skeleton for the character and add controls for each bone. This enables us to move and animate the virtual anchor's body and facial expressions.

Animation: With the rig in place, we use human-computer interaction technology to create animations for the virtual anchor's movements and actions using 3DMAX's animation tools. This includes animations for walking, speaking, and gesturing. We use keyframe animation and motion capture data to create natural and smooth movements. We also use emotion recognition technology to create the expression of virtual anchors with realistic appearances and movements.

3. Virtual Anchor Design Process

Role setting of virtual anchors

The role setting of the virtual anchor is the first step in the design process. Before determining a role, consider the following aspects:

- 1) Basic attributes of gender, age, height and body shape of the anchor.
- 2) The style and image characteristics of the anchor, including clothes, hairstyle, makeup, etc.
- 3) Their language ability, professional background, and their role in the live broadcast.
- 4) The anchors set the background story, hobbies, so as to better present a vivid image for the audience.

After determining the basic role of the anchor, it can be refined according to the needs. For example, if it is a children's education software, the anchor can be a kind and friendly teacher image, and if it is a simulated business game, the anchor can be a middle-aged businessman image. (ZhuHong, 2014).

3D model making

After completing the role setting, you need to transform the role setting into a 3D model, which is the second step of the design process. The 3D model production depends on the software 3Dmax. The production process mainly includes the following aspects:

- 1) According to the character setting, transform the 2D characters into 3D models, including the head, body, limbs and other parts.
- 2) Detailed on the model, including the production of facial expressions, hairstyles, clothes, etc.
- 3) Texture processing and animation to bind to the model.

Commissibug the model after the production is made. If there is a problem, the model can be modified until the model achieves the expected effect.

Application of motion-capture technology

After completing the model production, it is necessary to design the action of the virtual anchor. Traditional animation design requires manually drawing each frame of animation, which is inefficient. Now, motion-capture technology can be used to complete the animation design more efficiently.

Motion capture technology refers to the use of special devices to capture human movements and apply the captured data to the animation production of virtual characters. Common motion-capture devices include sensor sets, optical camera sets, and so on.

Through the motion capture technology, the movements of the real people are recorded, and analyzed and processed according to the recorded data, and the data is applied to the action design of Xiao Ji, so as to achieve a more real action effect.

There are several issues when applying motion capture technology:

- 1) Determine the type and number of motion capture devices.
- 2) Show the action of the anchors and capture the action data.
- 3) Clean and optimize the captured data to make it meet the body architecture and animation needs of virtual anchors.
- 4) Apply the optimized data to the virtual anchors for animation production.

Virtual anchor scene production

Virtual anchor scene production is the last step of the design process. The production of the anchor scene needs to consider the following aspects:

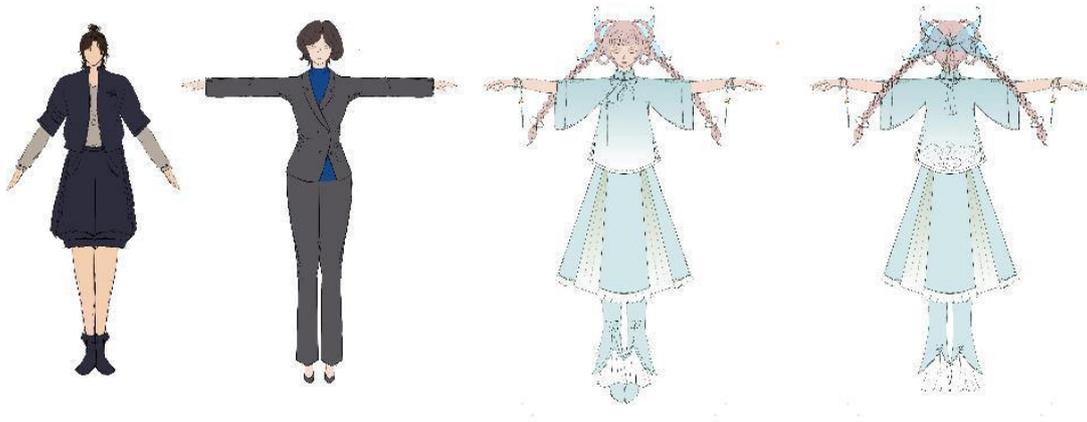
- 1) Scene design and construction, including background, props, lighting and other elements.
- 2) Interactive animation of the virtual anchors in the scene, including the interaction with the audience, performance, etc.

3) Special effects design of the virtual anchor scene.

In the scene production, each element in the scene is required to ensure the authenticity and aesthetics of the scene. In short, the design process of virtual anchor is a systematic process, which needs to be multiple links such as role setting, 3D model production, motion capture technology application and virtual anchor scene production. In practical application, the design process can be adjusted and optimized according to the specific situation to achieve the best results.

4. Case Study

To demonstrate the effectiveness of our method, we present a case study featuring a virtual anchor named XiaoJi. Designed using our proposed 3D MAX method, XiaoJi quickly gained popularity on a live streaming platform due to her realistic appearance and entertaining personality. The user experience was enhanced, leading to increased engagement and a large following, see Figure 1:



Xiaoji's modeling and animation technology involves many fields of technology, which requires the collaboration of multiple professionals to achieve a high-quality virtual digital character. By combining animation rendering technology, Xiao Ji can show more real movements, thus enhancing the audience's sense of immersion and interaction.

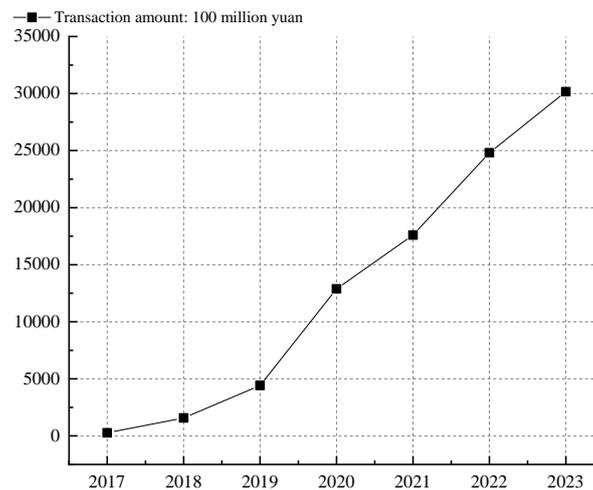
Analysis of practical effect

In the process of practice, the expression and interactivity of virtual anchors can be continuously improved through continuous trial and error and modification. At the same time, the operation strategy and business model of virtual anchors should also be considered in practice. Through continuous practice and feedback, better user experience and business benefits can be obtained.

In short, the design practice of virtual anchors based on 3Dmax requires in-depth study of market demand and audience taste, pay attention to details and sense of reality, and constantly improve and

enhance the expression and interactivity of virtual anchors in practice, so as to win the trust and commercial value of users. On the live broadcast platform, the application of virtual anchors is mainly used as live broadcast anchors. Virtual anchors can be designed through software like 3 Dmax and other software to flexibly show various scenes and characters. Virtual anchors are not limited by geographical restrictions and can live anywhere, saving physical space and labor costs. At the same time, virtual anchors can change their image at any time to attract more audiences, see Table 2:

Forecast trend of transaction volume of live streaming e-commerce in China from 2017 to 2023



6. Results

Our results show that the use of 3DMAX in virtual anchor design greatly improves user engagement and the overall experience. The realistic appearances and lifelike movements created using 3DMAX contribute to a more immersive and enjoyable experience. Integration with machine learning technologies also enhances the interaction between virtual anchors and users, making it more natural and human-like, see Figure 2:



7. Finding and Discussion

While our proposed method shows promising results in designing virtual anchors based on 3DMAX, there are several areas where further research and development can be conducted to improve the design process and enhance the user experience.

Real-time rendering

Currently, the rendering process for virtual anchors is time-consuming and requires powerful hardware. Future research can focus on developing real-time rendering techniques, allowing virtual anchors to be rendered and displayed in real-time, reducing the rendering time and improving the efficiency of the design process.

Facial expression and emotion modeling

In order to create more realistic virtual anchors, the modeling and animation of facial expressions and emotions should be further improved. Developing advanced techniques for capturing and replicating subtle facial movements and expressions can greatly enhance the realism and emotional range of virtual anchors.

Interaction and engagement

Virtual anchors are often designed to interact with users through chatbots or voice recognition systems. Future research can explore more advanced natural language processing techniques, enabling virtual anchors to have more intelligent and engaging conversations with users. This can include sentiment analysis, understanding context, and providing personalized responses.

Customization and personalization

Providing users with the ability to customize and personalize virtual anchors can greatly enhance the user experience. Future research can focus on developing user-friendly tools that allow users to easily modify the appearance, personality, and behavior of virtual anchors, making them more tailored to individual preferences.

Virtual reality integration

With the rise of Virtual Reality (VR) technology, integrating virtual anchors into VR environments can provide users with an even more immersive and interactive experience. Future research can explore the development of VR-compatible virtual anchor designs and investigate the impact of VR on user engagement and immersion.

8. Conclusion

The design of virtual anchors based on 3DMAX offers great potential in enhancing the user experience in the live streaming industry. Through the use of advanced modeling, rigging, and animation techniques, virtual anchors with realistic appearances and human-like movements can be created. The application of machine learning technologies further enhances the interaction between virtual anchors and users. However, there are still several areas for improvement, such as real-time rendering, facial expression modeling, and customization options.

Virtual anchors have emerged as a fascinating and innovative application of virtual reality and live streaming technologies. Through the use of advanced computer graphics techniques, such as the design method proposed in this paper based on 3DMAX, virtual anchors can captivate audiences with their realistic appearances and human-like movements. The integration of machine learning technologies further enhances the interaction between virtual anchors and users, providing a more natural and engaging experience.

As the field of virtual anchor design continues to evolve, there is still much room for improvement and exploration. For example, the speech synthesis technology of virtual anchors needs to be further improved, the scene construction needs to be more intelligent and humanized, and the material selection needs to be more accurate and flexible. In the future, we can further study and develop virtual anchor technology, improve its quality and efficiency, and provide users with more intelligent, personalized and rich media experience. Future research efforts can focus on refining the design process, developing more advanced animation techniques, and integrating virtual anchors into emerging technologies such as virtual reality. With continued innovation and collaboration, virtual anchors have the potential to revolutionize the live streaming industry and create new possibilities for entertainment and user interaction. Future research and development in these areas will contribute to the continuous improvement and evolution of virtual anchor design, providing users with even more engaging and immersive experiences.

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