Retraction

Retraction: Design of Double-effect Propulsion System for News Broadcast Based on Artificial Intelligence and Virtual Host Technology (J. Phys.: Conf. Ser. 2074 012096)

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This article has been retracted by IOP Publishing following an allegation that raises concerns this article may have been created, manipulated, and/or sold by a commercial entity. In addition, IOP Publishing has seen no evidence that reliable peer review was conducted on this article, despite the clear standards expected of and communicated to conference organisers.

The authors of the article have been given opportunity to present evidence that they were the original and genuine creators of the work, however at the time of publication of this notice, IOP Publishing has not received any response. IOP Publishing has analysed the article and agrees there are enough indicators to cause serious doubts over the legitimacy of the work and agree this article should be retracted. The authors are encouraged to contact IOP Publishing Limited if they have any comments on this retraction.

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Design of Double-effect Propulsion System for News Broadcast Based on Artificial Intelligence and Virtual Host Technology

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Abstract. A virtual host refers to a host who uses an avatar to submit contributions on a video website. The virtual host is a powerful combination of artificial intelligence technology and live broadcast. In recent years, virtual video hosts have sprung up on major video websites, and their popularity is growing rapidly. Virtual host technology has been applied to many areas of society. Based on this background, this article designs a news broadcast double-effect propulsion system based on artificial intelligence and virtual host technology. This article applies the virtual host technology to the field of news broadcasting, and realizes the double-effect advancement of virtual host technology and news broadcasting. The virtual host designed in this article mainly uses sign language to broadcast news, so this article first conducts a quick and brief knowledge of sign language, and then conducts a detailed analysis of the current research status of virtual host technology and artificial intelligence technology, and uses artificial intelligence. The technology realizes the motion control of the virtual host; then the intelligent algorithm is used to realize the superimposition and synthesis of videos, and a news broadcast double-effect propulsion system of artificial intelligence and virtual host technology is designed. Finally, this article carried out an experimental test on the system's simultaneous broadcast function and channel switching function. The test results excluded subjective human factors. After the improvement, the system can achieve simultaneous broadcast and successful channel switching.

Keywords: Artificial Intelligence, Virtual Host, Video Synthesis, Double-effect Advancement

1. Introduction

Sign language is a gesture language that expresses meaning by performing hand movements with appropriate facial expressions or postures. Sign language is mainly used for communication between deaf and dumb people. Ordinary people do not use Chinese sign language, which creates huge barriers to the communication between deaf-mute people and ordinary people [1]. In order to take care of the deaf-mute and promote communication between the deaf-mute and the outside world, the Chinese government began to regulate the Chinese sign language of the deaf-mute in the middle of the last
century. With the continuous improvement of social information, deaf-mute people urgently need more information to continuously improve or enrich their lives. However, deaf-mute people certainly cannot receive external audio information like ordinary people, especially TV news. At present, some TV stations use bilingual news to broadcast news. The traditional method requires a professional sign language host. Not only is the workload heavy and inefficient, but just like the local dialects of various regions, there are local sign languages in the sign language. This makes it difficult for deaf-mute people in different regions to communicate through sign language, which hinders the promotion of traditional Chinese sign language [2]. In view of this, this article applies virtual host technology and natural language technology to the field of sign language synthesis, continuously converts natural language text sentences into Chinese sign language, and expresses text information in Chinese sign language through the virtual host. By optimizing and combining the sequence of frames in the process of expressing the virtual host sign language, the technology is applied to media fields such as news broadcasting, event reviews, science and education [3].

Chinese scholar Li Yuqin pointed out that the news report format of virtual reality technology has brought a whole new viewing experience to the public. It has obvious advantages in focusing on scenes, integrating opinions and active participation, which has effectively promoted the development of our country's news media industry. There are still some drawbacks in the use of virtual reality technology in news, and the overall growth prospects are very broad [4]. Xie Zehui discussed the impact of virtual reality technology on the content of traditional news reports. Using VR news produced by The New York Times as a research sample, I learned that the narrative themes of VR news are mainly war, politics or ecology, rather than the reporter explaining the story to the audience in the video. The interaction between audience and information is the main difference between virtual reality news and traditional news. As an inevitable trend in the digital age, VR news has powerful functions that have changed the roles of journalists, listeners, and news producers, and narrowed the gap between news [5]. Diao Zhaoshi pointed out that VR technology, also known as virtual reality technology, mainly uses advanced computer technology to realize the combination of the real world and the virtual world. With the development of society and the continuous progress of science and technology, the application fields of virtual reality technology are becoming more and more extensive. According to traditional news reporting methods, the public can only understand news events from the perspective of a third party, but there are certain limitations. The use of virtual reality technology for news reporting can enable the public to perceive news content from the first angle and get a good experience on the news site. At present, the application of virtual reality technology in news reports is still in the early stages of exploration. In the future, based on continuous technological progress, VR technology will have broader development prospects [6].

With the rapid development of virtual moderator technology around the world, it has brought new impetus and development direction to various fields of society. The application of virtual moderator technology in news reports has gradually become a research hotspot in the field of news communication [7]. Due to the unique attributes of virtual host technology, traditional news reports have produced new changes in news concepts and technical production levels. At the same time, there are some problems in the process of using virtual moderator technology in news reports. Under the guidance of Marxist news concept, through the analysis of the unique advantages of virtual moderator technology, it is explored that virtual moderation can be used in news reports. The space of human technology enriches theoretical results and provides reference materials for future theoretical research. By studying the unique advantages of virtual host technology, it can present more close news reports to the audience, and provide media workers with experience in using virtual host technology in news reports [8]. Through the research of virtual host technology, media workers can better grasp the inherent properties of virtual host technology, know how to use the perception function, voice technology and immersion function of virtual host technology in news reports, and integrate content with virtual host technology. The combination will bring a better news experience to the audience and lay a practical foundation for those who want to engage in new media technology and application work.
2. Motion Control Technology of Virtual Host

2.1 Hand and Arm Movement Restraint

The degree of freedom of the hand and arm part accounts for about 2/3 of the degree of freedom of the entire human body model, which is one of the parts that are more difficult to control. There are many degrees of freedom and the motion control relationship is complicated. Before establishing the kinematics equations of the hands and arms, the constraint conditions in their motions should be analyzed first, so as to eliminate the impossible postures in the motion process, so as to avoid the unreality of the motion. Due to the mutual influence of the different parts of the torso and the arm, the joint motion of the arm cannot move arbitrarily in space, and has a certain range of extreme motion, which is called the static motion beam [9]. For the shoulder joint, it has three degrees of freedom, can rotate around three motion axes and spread under the kinematic chain. When disassembling this level of joint movement, please consider the actual arm rotation, bending, extension, and contraction. Developmental movements are independent of each other. Create a fixed coordinate system for each moving part, and use uniform coordinate transformation to solve the position and posture of the extreme coordinates of the virtual host in the basic standard car body system [10]. Among them, the position of the base coordinate system does not change with the movement of each part of the virtual host, and each fixed coordinate system is a coordinate system that is permanently connected to each moving part of the virtual host and moves in space. The formula used in the arm motion constraint process is:

\[ Q = \sum_{j=1}^{38} (G_j - G_{\theta_j})^2 + \sum_{j=1}^{38} (G_{\theta_j} - G'_{\theta_j})^2 \]  (1)

2.2 Motion Path Control

The process of mobile sign language expression is a process of constantly changing gestures and postures, but when studying this article, the description and control of the mobile process of sign language expression is based on many different characteristic postures. These characteristic poses are called basic frames. In an animation system that uses key frame interpolation, the number of key frames usually determines the quality of the animation. The more key frames, the better the animation effect, and vice versa, the worse the effect. However, too many key frames will also increase the control complexity and affect the system speed [11]. Sign language words are the basic unit of sign language ideology. Each sign language word is described by a series of motion gestures, and its starting position and ending position are important positions that mark the gestural characteristics of the word. In the process of sign language expression, the motion path of gestures is not all smooth curves, and sometimes there are some obvious inflection points. In order to ensure the accurate description of the motion posture, it is necessary to add key frames at the inflection point to control the posture. In order to effectively describe its motion trajectory, it is necessary to add some intermediate points between the initial position and the end position of the arc for control. The separation distance between the intermediate points is determined by the accuracy to be achieved. If the playback effect of the animation is required to be delicate and lifelike, a smaller distance is required. If you do not pursue the smoothness of the animation effect, but as long as you can express the meaning of sign language, you can use a looser dot pitch. In the overall movement of the gesture, the speed of the hand movement is not necessarily very uniform, but it may be fast and slow. If the change of this movement speed cannot be ignored in the sign language expression animation, the method of segmented control must be adopted. And each segment is approximated by uniform motion. After determining the key frames, you only need to select an appropriate interpolation algorithm and connect the key frames in a certain order to realize the control of the entire sign language expression movement process. The formula used in the control process of the motion path is:
\[
Q(u) = \sum_{i=0}^{3} P_{b_i}(u)
\]  

(2)

2.3 Choice of Interpolation Algorithm

Linear interpolation is the most basic interpolation algorithm. The calculated intermediate value and the two key values satisfy a linear relationship. Linear interpolation can be used for interpolation between any two values. For a pair of key positions specified by three-dimensional coordinates, linear interpolation can be used to calculate interpolated values between the values of the key positions at the same time. During an animation, this method can change the effect of the components at the same time, and can smoothly transition from one position to another [12]. Interpolation for rotation is linear interpolation while interpolating between a pair of key rotation angles. During the movement, it has the ideal effect of smoothly changing the rotation angle of each component's rotation axis. Therefore, linear interpolation can basically meet the interpolation needs between key frames in this article, and make the transition between various gestures smoother. However, linear interpolation has some shortcomings in sign language expression systems. Usually, for ideological purposes, in the process of moving sign language expression, the beginning and ending positions of sign language usually pause for a short period of time, and according to the general logic of kinematics, an object will go from one static state to the next static state. First, you must speed up the exercise process, and then slow it down. However, linear interpolation cannot describe the requirements of movement speed changes between basic frames. Aiming at the above-mentioned problems in linear interpolation, this article uses the Hermit-based interpolation interface to improve. A part of the Hermit spline is inserted into the two end points and the two end tangent vectors.

3. Realization of News Broadcasting System Based on Virtual Host Technology

3.1 Generation of Virtual Host's Sign Language Frame Sequence

VRML stands for Virtual Reality Modeling Language. It is a scene modeling language used to build real world or fantasy 3D world models, and has nothing to do with the platform. VRML is an object-oriented 3D modeling language. Its objects are called nodes, and the collection of child nodes can form a complex scene. Nodes can be reused to create dynamic virtual worlds through examples, given names and definitions. VRML uses a modeling language to construct computer-driven objects to reflect the outside world, which is similar to how most graphics software objects are constructed. VRML is a descriptive language used for 3D modeling and rendering. It can be written with an ordinary word processor, or it can be created or converted by a special program. VRML graphics rendering is real-time, born in response to the network, and changes with the development of the network. VRML is not a programming language, but a markup language, which defines the basic elements that constitute a 3D scene. VRML is the standard language of virtual reality. It uses text format for storage, the code is highly readable, and it provides a programming interface. Sign language words are the basic unit of the sign language expression system, and each sign language word has several gesture definitions. For words that exist in the sign language database, directly query the sign language database and append the word's sign language motion key frame sequence to the end of the key frame sequence to be displayed. For words that do not exist in the sign language database, query the phonetic dictionary and convert the word. For the pinyin sequence, the letters of this pinyin sequence are sequentially searched in the sign language database, and the sign language motion key frame sequence of these letters is appended to the end of the key frame sequence to be displayed. In this way, a whole sentence sequence of sign language frames is generated. Under normal circumstances, in the process of news broadcast, the broadcaster has more or less pauses for a certain period of time between each sentence. According to the length of the time interval, the system uses the virtual person's initial pose frame to interpolate between the end frame of the previous sentence and the start frame of the next sentence, so as to realize the natural transition between sentences in the process of sign language expression.
3.2 Video Synthesis

DirectShow is a set of streaming media development kits provided by Microsoft. DirectShow provides powerful support for downloading and playing media streams. It can easily capture data from the download card supported by the drive model, perform corresponding post-processing, and even save it to a file. It supports multiple media formats, making media playback easy. DirectShow uses models to manage the processing of the entire data stream. The functional modules involved in data processing are called sub-modules, and these sub-modules work with specific sequences in the model. To achieve the overlap of two video channels, the model must have two input ports and one output port. Since the data volume of the module will not be expanded after the input processing, and the input and output media types will not change, another input port can be added based on the original output port to accept the sign language frame sequence. The system implements a pair of input and output ports, let the video stream enter through this input port, and then directly call the control center on the function of this input port to perform video overlay, and then send the overlay data downstream to connect the module through the output port. In other words, there are some entrances that lead to the completion of the covering function. In addition, a custom input port is required to receive sign language frame video stream data for coverage. After the custom input port receives simple data, it transmits the data directly to the control center, and the control center stores the data. In this way, the synchronization between the input port and the output port can be achieved through the control center.

3.3 Video Overlay Method

The news broadcast double-effect propulsion system based on virtual host technology implemented in this paper combines natural language processing technology, virtual host motion control technology, and streaming media editing technology to realize automatic translation from natural language to Chinese sign language animation and apply it. Video editing technology adds sign language expression animation sequence to streaming media frame sequence. On this basis, this paper realizes the synchronization of the content of sign language expression and the content broadcast in the media stream through further screening and optimization of the sign language frame sequence. Video is composed of consecutive images frame by frame. Video overlay is to delete the unqualified pixels in all images in the video, and stack the remaining qualified images into the video that you want to synthesize. There are many ways to complete video superimposition. The most basic method is through pixel filtering. This article performs video superimposition based on the RGB value of the pixel. When performing video superimposition, the first thing to do is to scan and check the main video image, place a pointer on the part to be superimposed, and then calculate the pixel value of all the images. When the pixel is a background color pixel, do not scan, If it is not a background color pixel, use the calculated pixel value to replace the pixel value of the same part in the main video image. The video can be superimposed synchronously by subjecting all the images in the video to the above-mentioned superposition processing. It should be noted that when the background of the superimposed image is a pure color, a certain pixel error will be caused. At this time, a certain amount of redundancy should be considered in the superimposition algorithm.

4. System Test

4.1 Simultaneous Broadcast Function Test of the System

| Synchronization situation | The number of occurrences | Percentage |
|--------------------------|--------------------------|------------|
| Simultaneous broadcast   | 45                       | 75%        |
| Broadcast in advance     | 7                        | 11.7%      |
| Broadcast delay          | 5                        | 8.3%       |
| Broadcast messy          | 3                        | 5%         |

Table 1. Simultaneous broadcast function test of the system
According to Table 1 and Figure 1, we have conducted 60 tests on the system's synchronous broadcast function, of which 45 were synchronous broadcasts, accounting for 75% of the total, and 7 of them were broadcast early, accounting for 11.7%. Five times were broadcast delays, which accounted for 8.3%, and three were broadcasts that were messy, accounting for 5%. Analyzing the reasons for the out-of-synchronization of the broadcast, the reasons for the delay and advance of the broadcast are caused by the designer's frame design error in the virtual host's sign language frame sequence design process, and the messy broadcast is caused by the incorrect placement of the news PPT chapters. Therefore, excluding subjective factors, objectively speaking, the news broadcast double-effect propulsion system based on artificial intelligence and virtual host technology designed in this article can achieve simultaneous broadcast.

### 4.2 System Switching Function Test

| Channel change          | The number of occurrences | Percentage |
|-------------------------|---------------------------|------------|
| Successfully changed channels | 43                        | 86%        |
| Channel change error    | 2                         | 4%         |
| Can't change channels   | 5                         | 10%        |
According to Table 2 and Figure 2, we can know that the system has been tested for 50 times of channel switching function, of which 43 times have been successfully switched, accounting for 86%; there are 2 times of channel switching errors, accounting for 4%; there are 5 Can't change channels this time, accounting for 10%. Analyze the reasons for the channel switching error and the inability to switch channels. The cause of the channel switching error is caused by the system-related interface matching error, and the inability to switch channels is caused by the instability of the network. Therefore, excluding subjective factors, objectively speaking, the news broadcast double-effect propulsion system designed in this article based on artificial intelligence and virtual host technology has no problem in the channel switching function.

5. Conclusion
In this paper, virtual host technology and artificial intelligence technology are applied to the field of news broadcasting to realize the continuous conversion from natural language text sentences to Chinese sign language, and the text information is expressed in the form of Chinese sign language through the virtual host. And on this basis, a news broadcast double-effect propulsion system based on artificial intelligence and virtual host technology was designed and implemented. The system is applied to news broadcasts, event commentary, science and education and other media fields, which can not only improve the deaf and dumb people. The quality of life can also play a certain role in the dual-effect promotion of virtual host technology and news broadcast.

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