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Research Article

Simulation Design and Implementation of Voice Landscape Quantification in Virtual Reality Based on Cloud Computing

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Traditionally, the recognition of sound mainly focuses on the source of sound, such as level and quality. Now, the sound, the environment, and the listeners have begun to study the landscape structure, composition, and characteristics of the acoustic environment. The purpose of this paper is to study the simulation design of virtual reality voice landscape quantification based on cloud computing. Firstly, the definition and characteristics of cloud computing are described, and the key technologies of cloud computing are analyzed. Combined with the basic principles of technology selection, the virtualization technology is emphatically analyzed. By selecting 7 acoustic elements, such as traffic sound, water flow sound, fountain sound, birdsong, wind sound, rippling sound, beach sound, and seabird sound, the possible acoustic elements in a given park environment are simulated for subjective evaluation. The experimental results show that when the traffic sound is 60 dB, the evaluation result of the superimposed sound type is the same as that when the traffic sound is 50 dB. For the superimposed sound level, 30 dB and 40 dB are significantly different from 60 dB and 70 dB, respectively, 50 dB is only significantly different from 70 dB, while 60 dB is only not significantly different from 50 dB, and 70 dB evaluation is significantly different from each sound level. However, 60 dB can be regarded as the turning point of the evaluation result. When the sound level of the added sound is greater than 60 dB, the evaluation result is obviously worse.

1. Introduction

With the rapid development of cloud computing technology, it gets more and more attention and application in simulation design and other fields. As an important role of urban landscape, park plays an important role in urban construction and development. Urban park is the main place for people to have leisure, entertainment, and outdoor activities. Its impact on people is not only from the perspective of vision but also the category of hearing. For the landscape with only visual factors, it is a silent visual aesthetic. It is silent, such as a picture or a silent movie, which cannot give people a real dynamic effect. Because people's aesthetic experience of environment is completed by visual perception and auditory perception in coordination, without hearing, only vision, the aesthetic mood of landscape is incomplete. It is of great practical significance to study the simulation design and implementation of virtual reality voice landscape quantification based on cloud computing.

Preference evaluation and loudness judgment are determined by the level of two subjective equality points (PSE), compared with the fixed and common reference sound. The level difference between the two PSES is attributed to the additional perceptual aspects of polyphonic sound, which in turn become tangible and quantifiable in the form of DB values. In Ketaki's research, in addition to loudness perception, the whole of these additional perceptual aspects is included under the word "sound characteristics." The results showed that there was a significant difference between loudness judgment and preference evaluation, and a stable mean value of the level difference caused by the sound characteristics was obtained. The results show that the combination of two kinds of compound tones is beneficial, and the addition of combined tones has no negative effect on the evaluation of such sounds. For the evaluation of combined sound, the ratio between fundamental frequencies also affects perception [1]. In order to study the effect of interaction between visual and auditory stimuli on environmental perception, Yan combined 36 kinds of sounds and images in 75 subjects. The sound and image used are natural and seminatural environment and urban green space. Emotional response is measured by happiness. The results show that in urban green space, natural space, and cultural landscape, due to the significant information content of sound quality or the dramatic impact of the loss of sound quality on the audience's appreciation, it is necessary to determine the place or environment where it is necessary to protect the sound environment [2].

The main innovation of this paper lies in the subjective evaluation experiment of the quantification of soundscape elements. In this experiment, through the subjective evaluation of the sound landscape elements and their different sound levels in the urban park, the types and sound levels of the sound elements suitable to appear in the corresponding urban park landscape were found out, which provided the technical basis for the planning and environmental design of the urban park and the construction of the sound landscape. In the experiment, no background sound and traffic sound were selected as background sound, and their single sound and superimposed sound after adding sound scene elements were scored and evaluated by semantic differentiation. Finally, through the statistical analysis of the evaluation data, the sound scene elements suitable for participating in the design and the quantification of sound level are obtained in various cases in order to provide technical reference for the design of urban park sound landscape.

2. Proposed Method

2.1. Definition and Characteristics of Cloud Computing. The characteristics of cloud computing can be summarized into five points, which can be understood from the user terminal and cloud. (1) Resource pooling of IT infrastructure resources: for the cloud, cloud computing can integrate a large number of heterogeneous hardware resources of different manufacturers and models into a flexible and scalable computing resource pool through resource pooling technology to achieve unified management and scheduling of heterogeneous hardware resources [3]. For users, the heterogeneity of the underlying hardware facilities is shielded, and users do not notice the difference between heterogeneous hardware resources in the use process [4]. Users only need to apply to the cloud for the required computing resources to obtain the corresponding computing resources (computing, storage, and network) [5]. (2) Dynamic configuration of computing resources: for the cloud, the cloud can automatically divide or release different computing resources according to the needs of users [6]. For example, when a user requests a virtual machine, the cloud will match automatically according to the configurable computing resources of the resource pool, so as to realize the rapid scheduling of computing resources. After using this part of the computing resources, the computing resources will be released back to the resource pool for other users to use. Dynamic allocation of resources can improve the utilization of IT infrastructure. (3) Network based access: the cloud servers are connected through the network, and the user terminals and the cloud are also connected through the network. Computing resources in the cloud are provided to user terminals through the network, and the promotion and popularization of network bandwidth play an important role in the promotion of cloud computing [7, 8].

2.2. Key Technologies of Cloud Computing

2.2.1. Virtualization Technology. The concept and technology of virtualization are evolving. At present, the virtualization of cloud computing platform can be understood as the virtualization of hardware abstraction layer, not just the virtual operating system. By virtualizing a physical machine into multiple virtual machines, each virtual machine can run a completely different operating system, and the execution environment of the virtual machine is completely independent [9]. The core technologies of virtualization can be divided into four categories according to virtual hardware objects, including CPU virtualization, memory virtualization, *I/O* device virtualization, and network virtualization. Hardware virtualization technology can be divided into three categories, including full virtualization technology, semivirtualization technology, and hardware assisted virtualization technology [10, 11].

2.2.2. Full Virtualization Technology. In the process of hardware full virtualization, the virtual machine management software translates and executes the instructions executed by the virtual machine in the form of pure software and does not need to modify guest OS in the whole process of using. Its advantage is that users can run virtualization without modifying the operating system, but its virtualization hardware speed will be slower [12, 13].

2.2.3. Semivirtualization Technology. Different from the full virtualization technology, the semivirtualization technology needs to modify the core code of the customer operating system [14]. The guest OS of the modified kernel is run on the virtualization management layer, and the virtualization is realized through the interaction between hypervisor and the underlying hardware [15]. Typical products of this technology include Xen and Hyper-V. In Xen technology, it is necessary to modify some codes in the guest OS kernel and add virtualization layer. The modified guest OS transforms the operation related to privileged instruction and directly transfers it to the virtualization layer, which interacts with the host hardware. Xen's virtualization layer supports the optimization of batch processing and asynchronous processing, which makes the processing speed of semi-virtualization faster [16]. Compared with the full virtualization technology, the advantage of the semi-virtualization technology is that the architecture is more concise, and it has certain advantages in the overall processing speed [17, 18]. The disadvantages of semi-virtualization technology need to modify guest OS, which is inconvenient for users.

2.2.4. Hardware Assisted Virtualization Technology. Hardware assisted virtualization technology is the mainstream virtualization technology, which is considered to be superior to full virtualization technology and semi-virtualization technology. Its core idea is to introduce new instruction and operation mode so that the virtual machine monitor and guest OS can run in different modes (root mode or nonroot mode), and unmodified guest OS can run in privilege level 0 (ring 0) [19, 20]. The core instructions of guest OS are directly delivered to the hardware processing and execution of the computer system without the transfer and intervention of the VMM layer. When guest OS runs into special instructions, the system will switch to the VMM layer and VMM will process the special instructions [21]. The mainstream hardware assisted virtualization technologies include Intel's VT-x technology and AMD-V technology [22]. At present, the mainstream full virtualization and semivirtualization products support hardware assisted virtualization, including VirtualBox, KVM, VMware vSphere, and Xen. The advantage of hardware assisted virtualization technology is to introduce hardware virtualization technology and add virtual instructions to the hardware. Users do not need to modify the core code of the client's operating system, and the virtualization processing speed is close to the physical machine [23, 24].

2.3. Virtual Reality Technology. With the development of virtual reality in recent years, more and more attention has been paid to it by scholars at home and abroad as well as in the industrial field. In military, medical, scientific research, education, entertainment, design, aerospace, and other fields, VR has been widely used. VR, with computer technology as the core, creates a certain range of interactive digital environment similar to the real environment in terms of vision, listening, touch, and so on. "Virtual" means that the environment created by VR is virtual and artificial, which exists in the computer. Users should be able to enter the environment and interact with the environment in a natural way, so as to achieve the effect of simulating the real world environment as much as possible.

VR is also an advanced human-computer interaction mode in essence. Because of its real-time three-dimensional space performance ability, as well as rich auditory and tactile feedback, it has changed the traditional rough and boring interaction between human and computer, and brought new possibilities for human beings to explore the means of virtual and simulation reality. A complete VR system should contain at least three basic elements: operator, machine, and man-machine interface. Among them, the machine refers to the computer equipped with corresponding software programs to calculate the virtual digital environment of production and user interaction, and the human-computer interface refers to the sensing and control equipment connecting the operator and the digital environment. Because VR overcomes all kinds of disadvantages of traditional human-computer interaction mode and brings users more immersive and intuitive virtual environment interaction experience, it has attracted more and more attention in the society. The market and products related to VR are becoming more and more mature in recent years. The existing main VR products include hardware equipment and software content. Hardware equipment mainly includes headwear equipment (glasses, helmets, and all-in-one machine), nonheadwear equipment, and gloves, while software content includes games, scenes, videos, and distribution platforms.

The increasingly mature VR theory and technology, as well as a variety of software and hardware platforms and devices, provide a vast imagination space and application possibilities for domestic and foreign researchers and market participants. It is in this environment and background that this paper attempts to apply the most advanced VR technology to the evacuation behavior test in the subway station. On the one hand, it enriches the application scenarios of VR technology, and on the other hand, it explores and complements the deficiencies in the field of evacuation test in the subway station.

2.3.1. Characteristics of Virtual Reality Technology

Immersion. Immersion refers to the degree of reality that VR users exist in the virtual digital environment as the protagonist. It can also be called presence, which is the main technical feature of VR technology. Users wear VR devices, such as glasses, helmets, interactive gloves, and shoes, so that their senses can be fully placed in the environment created by VR, so that they can also become part of the environment and devote themselves to it. Therefore, immersion highland is usually regarded as a benchmark to measure the advanced degree and performance of VR system. The reason why users feel immersed is that they have the illusion and perception of real objects in the digital environment. In order to achieve a good immersion effect, VR system needs to achieve multiperception and autonomy. Multiperception refers to the system not only includes visual perception but also includes auditory perception, odor perception, tactile perception, strength perception, and even smell and taste perception. Autonomy refers to the dynamic performance of users in accordance with the common sense of users or the physical laws of the natural world when they act independently or interact with each other in the virtual environment. For example, when an object is affected by a "force," it moves, overturns, or falls in the corresponding direction. In addition, the depth of information, resolution, width of visual field, refresh rate, and real-time response speed of visual image are also important factors affecting immersion.

Interactivity. Interactivity refers to the user's operability to objects in the virtual digital environment and the natural degree of feedback from the environment. The interactivity of VR system comes from various sensing devices, such as VR helmet/glasses with gyroscope, data glove/handle, sensing shoes, and treadmill. Many sensing devices enable the computer to timely feedback the image, sound, and touch information presented by the system by sensing the movement of the user's head, eyes, hands, and feet. Therefore, in the virtual digital environment, users can complete interactive operations such as turning, walking, and grabbing objects, which can be mastered only by natural intuition.

Conceived. In many fields, human beings are faced with problems that are difficult to solve or too high cost by using traditional methods, such as aerospace, military joint exercise, nuclear reactor maintenance, weather natural disaster prediction, safe evacuation exercise, and medical simulated operation. In such projects, using traditional means to carry out directly is faced with different degrees of high cost, long cycle, and even a certain life safety risk for participants. Applying VR technology to these fields can alleviate the abovementioned problems to a great extent and provide a new solution for all kinds of experimental, development, simulation, and maintenance projects with high risk coefficient, high cost, and long period, which cannot be achieved under normal conditions. In this sense, what we need to consider most is to give full play to human creativity and imagination, develop VR applications for specific problems, and match appropriate occasions and objects. In this way, work efficiency can be greatly improved and cost and time can be saved, so as to further stimulate innovation and creation.

2.3.2. Types of Virtual Reality Technology. Virtual reality integrates a variety of technologies, including modeling technology, system integration technology, location and direction tracking technology, and graphics/image processing technology. According to the degree of user immersion, virtual reality (VR) can be divided into the following four types:

(1) *Immersive VR System.* Equipped with helmet VR device, using position tracker, data glove, and other input and output devices, users are placed in the virtual reality world and completely immersed in it.

(2) *Desktop VR System.* The simulation is performed by a personal computer and the computer screen is used as a window. Users observe the virtual field, which is based on VRML or static image. Users can directly observe and browse the virtual scene through the computer screen. This system has low cost and weak immersion and is easy to develop.

(3) *Enhanced VR System.* Portable systems and head-mounted virtual devices have brought great convenience to users and enhanced their sense of experience. The "real environment" brought by the devices allows users to be immersed in the virtual world.

(4) *Distributed VR System.* Under the premise of network coverage, multiple users are in the same virtual space for collaborative perception and information sharing. Such systems require high bandwidth.

2.4. Connection between Elements of Sound Landscape

(1) The connection between voice and listener

Because of the particularity of sound transmission form, when people receive sound, they will receive all the sound transmitted through the medium. If we choose to block the sound, we will block all the sound, but we cannot block part of the line of sight like the observation object, which can block the information we do not want to receive. For example, when we communicate with each other, we cannot choose to hear only the voice of the communicators, but shield the surrounding interference, because they are all propagating through the same medium of space. If we block the first propagation path, we will not be able to receive any sound.

The good or bad voice will affect the listener's perception of the environment. Similarly, the listener's real-time quality will also affect the evaluation effect of the sound landscape.

(2) The connection between sound and environment

As a part of the whole environment, sound belongs to the environment. If sound is separated from the environment and exists alone, it is not easy to have a sense of picture and appreciation. If the environment is lacking sound, it will also appear empty and lack multidimensional landscape. If the two are not related, the landscape will not have integrity and appreciation. In the environment, people often take one or a kind of sound as the object of consideration, but ignore the relevance of the sound landscape. Sound is the overall sound environment in the environment as the object of study. What should be considered is the integrity of the sound landscape composed of various sound elements in the environment and the connection and Juhe between the elements. At the same time, in the study of sound environment, people often focus on the volume, pressure level, and frequency of sound in the environment, but ignore the social and historical nature of sound. When people appreciate the sound as a landscape in the environment, they not only appreciate its timbre, tone, and rhythm but also associate the social elements received by the vision in the environment and the historical background in the big environment.

(3) The relationship between the listener and the environment

The listener is the subject who evaluates the sound landscape based on the environmental background. As for the sound, the listener belongs to one of the influencing elements in the environment. As the listener itself belongs to the dynamic and unstable element, the perception of the sound will change with the change of the environment. At the same time of human perception of sound, the visual landscape received by the listener will also affect the subjective evaluation of the sound landscape. For the understanding and experience of environment, it is through hearing to receive the sound of environment, the spatial color and shape of visual receiving environment, as well as the "holographic" experience of touch, smell, taste, and so on, which are mutually complementary and coordinated. If you hear the sound of soup and water in the desert, when the desert is already smoke and dry, you will be ecstatic to feel the sound of water. If you hear the sound of water in the cold and cool caves in the cold winter, it will only aggravate the cold and cold feeling of the listener and will not have a positive evaluation of the sound of water.

3. Experiments

3.1. Quantification of Soundscape Elements. Through the investigation of the current situation, we can also find people's preference for the sound elements existing in the urban parks, as well as people's expected sound. This kind of typical sound elements was selected for the related quantitative evaluation experiment.

Objective. Through the subjective evaluation of 7 kinds of typical sound pressure levels (including single sound pressure level and multiple sound superimposed sound pressure level), this experiment quantitatively studies the sound landscape elements of the urban park sound landscape, hoping to find out the sound landscape elements and their appropriate sound levels.

Experimental Location. Semianechoic room of Architectural Physics Laboratory of Architectural College; experimental equipment: computer, speaker, MP3 player, CoolEdit sound production and editing software, and awa6270 noise spectrum analyzer; sound material: take the sound elements from the network sound effect material library, select the suitable ones, and use the CoolEdit software to make and edit the sound so that it is conducive to the evaluation experiment.

Subjects. 17 college students and graduate students. The basic information of subjects is shown in Table 1.

3.2. Experiment Preparation

3.2.1. Determination of Quantification Range of Sound Level. For single tone evaluation without background sound, 5 dB is used as evaluation interval. In order to avoid the fatigue and fidgety psychology caused by the long-term exposure to the semianechoic room environment, the interval of sound stimulation evaluation is extended to 10 dB when there is the superimposed sound evaluation of background sound.

3.2.2. Setup of Experiment Process. Three types of typical parks are selected: street park in busy urban traffic area, comprehensive park with natural landscape such as water and trees, and coastal park in coastal cities.

Download the sound material from the network sound effect material database and select 7 types of typical sound suitable for the abovementioned urban parks, including traffic sound, water sound, fountain sound, birdsong, wind sound, waves lapping on the shore rock and beach sound, and seabird sound.

After calibrating the volume and sound level of each sound element by using the awa6270 noise spectrum analyzer, the abovementioned seven sound elements are edited into nine different levels of sound files by using the CoolEdit sound production editing software, including 30 dB, 35 dB, 40 dB, 45 dB, 50 dB, 55 dB, 60 dB, 65 dB, and 70 dB.

In the semianechoic room, the abovementioned 7 kinds of sounds are played with and without background sound, respectively, to simulate the possible sound scene elements in the above established park environment.

4. Discussion

4.1. Average Value of Favorable Evaluation Data Analyzed by Excel Software

4.1.1. Completely Quiet. The evaluation score and its average value of 17 subjects in completely quiet environment are 2.71, as shown in Figure 1. Among them, the scores of 1, 2, 3, 4, and 5 are five grades, which, respectively, represent the five grades of comfort and pleasure, general, medium, uncomfortable, fidgety, very uncomfortable, and fidgety.

It can be seen from this that, in the park, if it is very quiet and there is no sound, people's feelings basically tend to be generally moderate without obvious feelings.

4.1.2. Without Background Sound. In the case of no background sound, the average value of 17 samples obtained from the evaluation of 30 dB, 35 dB, 40 dB, 45 dB, 50 dB, 55 dB, 60 dB, 65 dB, and 70 dB of 7 types of sound, i.e., traffic sound, flowing water sound, fountain sound, birdsong sound, wind sound, wave sound, and seabird sound, is respectively, evaluated. The curve is shown in Figure 2.

When the traffic sound is 30 dB and 35 dB, it has little effect on people, and the subjects feel it is close to the average/medium level; when 40 dB, the curve rises, the favorability becomes poor, and the general/medium level tends to be uncomfortable and fidgety, but it is still near the middle line; when 45 dB–55 dB, the traffic sound is fidgety and uncomfortable; when the sound level reaches 60 dB, the traffic sound tends to be very fidgety and uncomfortable When the sound level rises to 70 dB, the degree of good will almost reach the extreme value of the evaluation level, which is very annoying and uncomfortable.

When the sound level of running water is 30 dB–50 dB, the preference of subjects is near the comfortable and pleasant level, which tends to be the same; when the sound level reaches 55 dB, the preference is slightly worse, but still in the comfortable and pleasant state; when the sound level is 60 dB, the preference tends to be in the middle state of general/middle class; when the sound level is 65 dB, the preference tends to be fidgety and uncomfortable; when the sound level rises to 70 dB, the good feeling of underwater sound has reached a state that

Table 1: Basic information of subjects.

Serial number	Gender	Age	College
1	Female	24	School of Architecture
2	Female	23	School of Architecture
3	Female	22	School of Environment
4	Female	29	School of Architecture
5	Male	26	School of Architecture
6	Male	23	Institute of Construction Engineering
7	Male	24	Chemical Engineering Institute
8	Female	24	School of Science
9	Female	24	School of Environment
10	Female	22	School of Environment
11	Male	24	School of Architecture
12	Male	25	School of Architecture
13	Female	25	Institute of Construction Engineering
14	Female	22	Chemical Engineering Institute
15	Female	23	Institute of Construction Engineering
16	Male	24	College of Automation
17	Female	24	School of Architecture

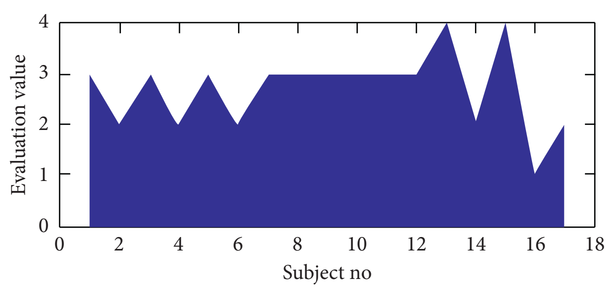

Figure 1: Data sheet of evaluation value of favorability.

makes people feel fidgety and uncomfortable. The good feeling of underwater sound has reached a state that makes people feel fidgety and uncomfortable.

The relationship between sound type and sound level is not in a positive proportion. The curve of water sound, fountain birdsong, and seabird sound is slightly parabola shaped with upward opening, so it is not that the lower the sound level, the more comfortable and pleasant it is. When the sound levels are 40, 40, 45, and 35 dB, respectively, the evaluation of likability is the highest among the nine sound levels. The turning point of the evaluation of traffic sound, water sound, fountain sound, birdsong, wind sound, wave sound, and seabird sound is 40, 65, 55, 65, 40, 60, and 55 dB, respectively. That is to say, when the sound level rises to these decibels, the evaluation of sound element's liking begins to be fidgety and uncomfortable.

4.2. SPSS Statistical Analysis Software Analysis Scoring Method Influence of Each Group's Evaluation Data

4.2.1. Without Background Sound. The mean value of the sound level of each sound element does not consider the element and sound level average of each sound type. It can be seen that the evaluation of 70 dB sound is the worst and that of 35 dB sound is the best. According to the evaluation sequence from good to bad, they are 35 dB, 30 dB, 40 dB, 45 dB, 50 dB, 55 dB, 60 dB, 65 dB, and 70 dB.

There is no significant difference between the evaluation results of 35 dB sound and 30, 40, and 45 dB sound and the evaluation results of 50–70 dB sound. The comparison results of 40 and 45 dB are the same. It is found that the evaluation results of 50 dB–70 dB sound are significantly different from those of other sounds, as shown in Figure 3.

4.2.2. Street Park (with Traffic as Background). When the traffic sound is 30 dB, the evaluation results of fountain sound, birdsong sound, and wind sound are significantly different from those of traffic sound after superposition, which shows that these three types of sound have a great impact on the evaluation. When 30 dB, 40 dB, and 50 dB sound are added, there are significant differences with 60 dB and 70 dB sound, respectively, as shown in Figure 4.

When the background sound is 30 dB, the comparison result of the evaluation value of each added sound type is shown in Table 2:

Similarly, when the traffic sound is 40 dB, the result is the same as mentioned above.

When the traffic sound is 50 dB, there is no significant difference between the fountain sound and the wind sound and the traffic sound, but the difference between them is

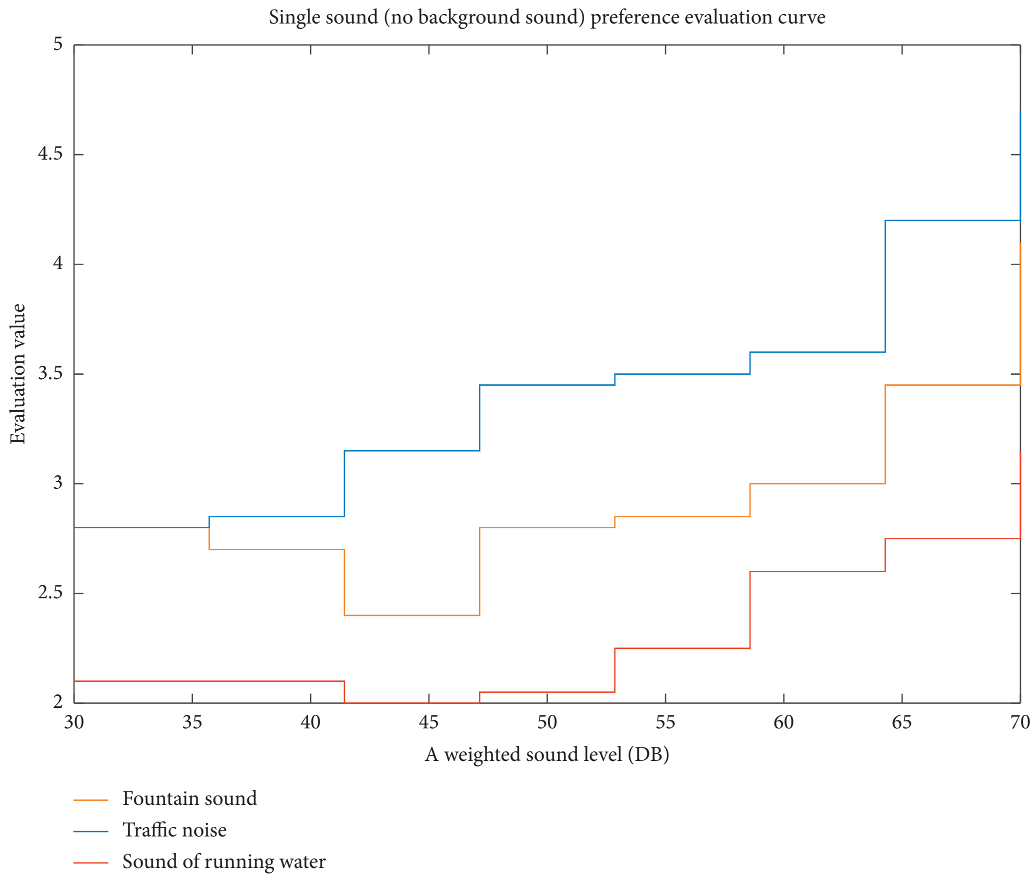

Figure 2: Comparison of traffic sound, running water sound, and fountain sound.

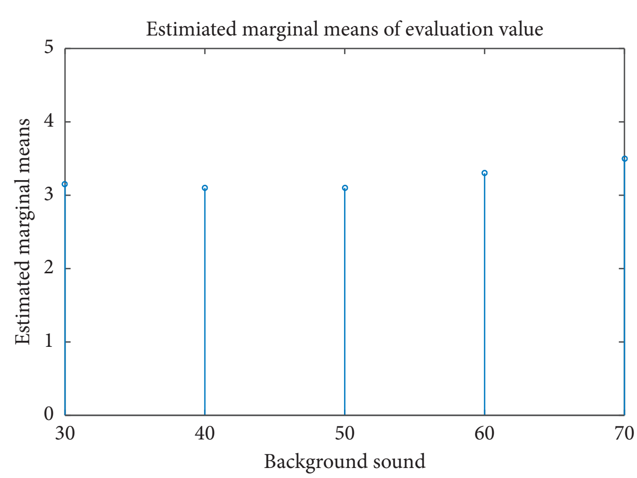

Figure 3: Contour map of different sound level background sound with respect to marginal mean of evaluation value.

significant. The results of comparison between the two sound levels are the same as mentioned above.

When the traffic sound is 60 dB, the evaluation result of the superimposed sound type is the same as that when the traffic sound is 50 dB. For the superimposed sound level, 30 dB and 40 dB are significantly different from 60 dB and 70 dB, respectively, 50 dB is only significantly different from 70 dB, while 60 dB is only not significantly different from 50 dB, and 70 dB evaluation is significantly different from each sound level.

When the traffic sound is 70 dB, the evaluation result of the superimposed sound type is the same as that when the traffic sound is 50 dB. There is no significant difference in the evaluation results of the superimposed sound level.

To sum up, in the street center park, with the traffic sound as the background sound, the subjective evaluation results of

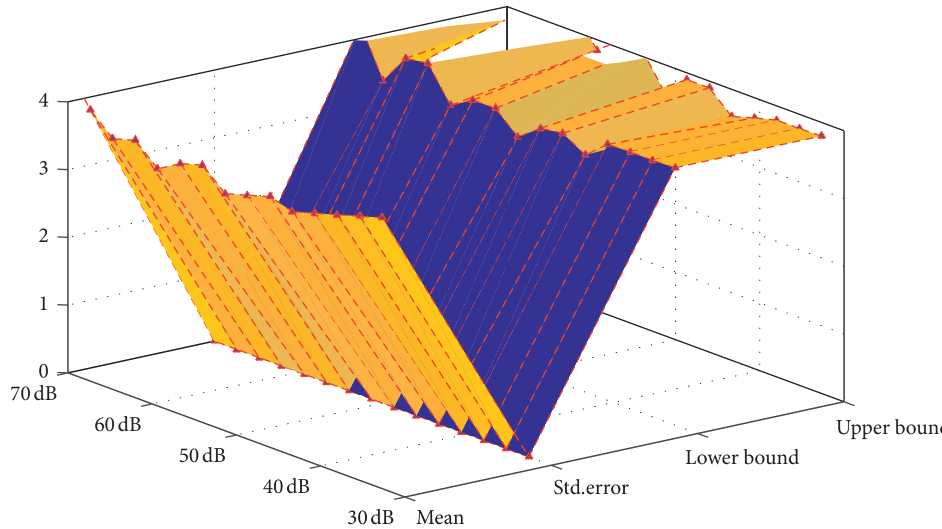

FIGURE 4: Comparison and statistics of the added sound value of different sound levels and different types.

TABLE 2: Comparison results of evaluation values of each added sound type when background sound is 30 dB.

(*I*) type 30, (*J*) type 30	Mean difference (I-J)	Std. error	Sig.[a]	95% confidence interval for difference[a]	
				Lower bound	Upper bound
Fountain, birdsong	0.224*	0.088	0.012	0.049	0.398
Sound of wind	−0.565*	0.088	0.000	−0.739	−0.390
Birdsong, fountain	−0.224*	0.088	0.012	−0.398	−0.049
Sound of wind	−0.788*	0.088	0.000	−0.963	−0.614
Sound of wind and fountain	0.565*	0.088	0.000	0.390	0.739
Birdsong	0.788*	0.088	0.000	0.614	0.963

adding fountain sound, birdsong sound, and wind sound, respectively, show that the evaluation results of birdsong and its superposition are significantly better than those of fountain sound and wind sound, so the elements in the soundscape are very important for constructing the virtual reality world. However, 60 dB can be regarded as the turning point of the evaluation result. When the sound level of the added sound is greater than 60 dB, the evaluation result is obviously worse.

5. Conclusions

The development of simulation technology depends on the development of computer science and technology. The application of new computer technology (cloud computing technology) to nuclear simulation platform conforms to the development law of simulation technology. This paper describes the definition and characteristics of cloud computing and discusses the significance of the simulation design based on the technology of cloud computing to build virtual reality voice landscape quantification. This paper analyzes the key technologies of cloud computing technology, combined with the basic principles of technology selection, focusing on the analysis of virtualization technology.

Firstly, through the classification of sound, this paper finds out the main sound elements, people's preferences, and expected sounds and takes them as the main elements of the sound landscape, providing the necessary basis for the quantitative simulation design of virtual reality sound landscape based on cloud computing. In the experiment of quantitative evaluation of soundscape elements of urban parks, through the subjective evaluation of different types of sounds of different sound levels by the subjects, find out the types and sound levels of sound elements suitable for the corresponding urban park landscape and provide technical basis for the planning and environmental design of urban parks and the construction of soundscape.

In this paper, seven kinds of sound scene elements, namely, traffic sound, water sound, fountain sound, birdsong sound, wind sound, waves lapping on shore rock and beach sound, and seabird sound, are selected for the experiment, and the sound scene elements that may appear in the given park environment are simulated under the sound levels of single sound 30 dB, 35 dB, 40 dB, 45 dB, 50 dB, 55 dB, 60 dB, 65 dB, and 70 dB and superimposed sound 30 dB, 40 dB, 50 dB, 60 dB, and 70 dB, respectively.

Data Availability

No data were used to support this study.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

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