Research on the Innovation of College English Teaching Mode from the Perspective of VR/AR Technology

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Abstract: *In order to improve the innovation effect of English teaching mode, this paper applies Augmented Reality (AR) and Virtual Reality (VR) technology to the innovation of college English teaching mode to promote the improvement of English teaching quality. Moreover, this paper accelerates ray tracing through Compute Unified Device Architecture (CUDA)'s parallel operations, hierarchical bounding box space structure, and a series of optimization methods for Monte Carlo estimation sampling convergence. Furthermore, this paper computes global illumination by collecting lighting information in textures through voxel cone tracking. In addition, this paper proposes attenuation based on normal weights, which can reduce the normal consistency problem of voxel direct lighting calculations. Through the experimental research, it can be seen that the college English teaching model based on VR/AR technology proposed in this paper can effectively improve the effect of English teaching.*

Keywords: *VR/AR technology, college English, teaching mode, innovation*.

Received March 14, 2024; accepted October 24, 2024
https://doi.org/10.34028/iajit/22/1/1

1. Introduction

Using speech recognition and processing technology, intelligent and efficient human-computer interaction learning can be realized. Through the data processing and intelligent analysis technology of professional education, the data processing of the homework and other related materials involved in the learning process can be carried out. Moreover, using data analysis technology, it is possible to analyze individual students' mastery of knowledge, find problems in their knowledge structure, and dig out corresponding strengthening exercises in a targeted manner, thereby optimizing students' knowledge system. In addition, the teaching system based on AI, big data and other technologies can also comprehensively evaluate students, accurately locate students' weak knowledge points, and intelligently plan students' studies [5]. At the same time, computer vision technology can be used to dynamically capture students' facial expressions during the learning process through intelligent learning assistants, and then eye-tracking technology can be used to depict students' attention trajectories as point distribution maps. In this way, teachers can indirectly understand the degree of concentration of students in learning, and at the same time, it can also help students to improve the intelligent learning assistant that assists learning ability according to the degree of concentration in the learning process. The application of intelligent teaching tools helps to enrich teaching methods, helps to improve students' participation in teaching activities before, during and after class, helps to improve students' enthusiasm for learning, and helps teachers to grasp the learning effect of students, and finally realizes the classroom teaching paradigm with students as the main body [6].

2. Related Work

In the context of intelligent teaching, the teaching form will also undergo fundamental changes, and the teaching form will be diversified. With the wide application of network technology and multimedia, the teaching forms have become more abundant, and new teaching modes such as network teaching, blended teaching, micro-lectures, and flipped classrooms have emerged. Teaching content and forms are more diverse and three-dimensional [21]. Playing teaching animations in the process of intelligent teaching is conducive to enhancing students' perceptual understanding of knowledge. Relying on big data, normalizing data collection, analyzing big data for educational evaluation, is conducive to the personalization of teaching and data management, and achieves accurate teaching, learning and management. Virtual simulation technology can also be used for virtual simulation teaching, providing virtual or simulated scenarios similar to the real world, allowing students to "immerse themselves" in a real and vivid learning experience. For example, students use body language without using complex controls. The device can be immersed in the scene and interact with the content, bringing a new control experience to the students, and also improving the teaching effect [13].

Intelligent teaching is student-centered teaching, including student learning, student development, and student learning effects. With the continuous development of intelligent technology, in the traditional teaching mode, more scientific and technological means and methods will be gradually introduced to apply to theoretical education and skill education, which not only improves students' learning efficiency but also improves teachers' utilization of time. Teachers can then have enough time to do more valuable work that cannot be replaced by machines, such as paying attention to the inner thoughts and feelings of students, caring about students' learning situation, entering students' minds, becoming psychological tutors, and stimulating students' learning motivation [20]. Students can also be freed from the traditional factory-style teaching mode, and can arrange their own learning without wasting time to adapt to the teaching styles of different teachers. While improving their learning efficiency, they can also enjoy more personalized services. In the absence of one-on-one tutoring from teachers, intelligent technology can also be used to obtain learning feedback, master their actual learning situation, and make improvements based on problems [7].

At this stage, the lag of artificial intelligence teaching places in colleges and universities is the main problem that hinders the innovation of teaching models, and many information-based educational equipment based on Artificial Intelligence (AI) technology can provide great help for college education. Therefore, colleges and universities should increase investment, build intelligent teaching platforms, and continuously promote the construction and application of software and hardware educational equipment, so as to provide high-quality conditions for innovative teaching models under intelligence [19]. For example, among many jobs in the accounting field, it is necessary to rely on intelligent equipment to help complete the corresponding work. The introduction of such equipment into accounting professional education by colleges and universities can provide technical support for their practical education, thereby optimizing the educational efficiency of this major and the quality of talent cultivation.

Colleges and universities should innovate the teaching mode under the intelligent situation, and should cultivate the ability of teachers to implement intelligent education, that is, college teachers should promote the deep integration and application of learning methods, teaching methods, classroom forms and intelligent technology based on the teaching practice of specific subjects under the intelligent situation, so as to effectively organizing classroom teaching and cultivating the ability of students' core literacy [12]. Improve teachers' intellectual literacy. In the context of artificial intelligence, teachers should mainly improve their intelligent literacy from the perspective of the integration of intelligent technology, education, and teaching. Specifically teachers should have sensitivity to whether intelligent new technology is suitable for their own teaching and the ability to apply intelligent technology innovation to teaching; be able to effectively use various new educational products to build teaching suitable for students' learning and growth a new ecological environment to stimulate students' enthusiasm for learning; rational use of artificial intelligence evaluation tools to carry out personalized evaluation of students, so as to grasp the learning dynamics of individual students in a timely manner [15]. Secondly, improve the ability of teachers to use data in the process of intelligent teaching. With the intelligent teaching mode, the teaching process has gradually realized data management. Teachers must convert teaching concepts, use all teaching data in the teaching process, carry out visual analysis of data, and generate multi-dimensional learning reports of classroom students, so as to truly realize individualization and diversification of student education, and innovate a new ecology of education and teaching.

In the artificial intelligence environment, although the content of jobs in various fields is very different, they have undergone tremendous changes under the support of AI technology. According to new job requirements and content, the knowledge and skills required by each position also change accordingly [1]. Colleges and universities should carry out curriculum reform for professional courses in a timely manner, highlight the top-level design of courses and teaching, and pay attention to the content system and strategic trend of talent training in the information age. The innovation of school-enterprise cooperation mode is an important link in the reform of teaching mode in colleges and universities. Therefore, colleges and universities can cooperate with enterprises in the following aspects based on the premise of mutual benefit and win-win [10].

The development of colleges and universities under intelligence should pay attention to inter-school cooperation and exchanges, realize the exchange and sharing of resources between schools, and take the road of cooperation and win-win. Inter-school exchanges at the management level can not only promote the management to continuously improve their professional quality and ability to perform their duties, but also encourage colleges and universities to abandon experience management as soon as possible and gradually move towards humanistic management; inter-school exchanges at the teacher level can continue to promote teachers' professionalism Inter-school exchanges at the level of teaching seminars can quickly improve teachers' teaching ability, learn from others' strengths, and help create efficient classrooms [4]; Inter-school exchanges at the student level not only broaden students' horizons, but also promote students' comprehensive quality. In the era of intelligence, inter-school cooperation and exchanges are an ideal way to promote the growth of colleges and universities. Therefore, colleges and universities should strengthen the system construction of inter-school cooperation, rely on the resources of colleges and universities to promote the development of schools; use the effect of famous schools to gain experience in running schools; at the same time, strengthen exchanges and mutual visits between sister colleges and universities [18]. Through inter-school cooperation, we can promote the common development of colleges and universities, share high-quality educational resources, give full play to the advantages of their respective educational resources, and carry out cooperation and exchanges in education and teaching management, cadre exchanges, teacher training, discipline construction and student exchanges [3]. The focus can be comprehensive and in-depth cooperation in the fields of artificial intelligence, big data, Internet of Things and other advantageous disciplines through subject cooperation, laboratory co-construction and sharing and other forms, which will further expand and deepen inter-school cooperation, and promote mutual learning and mutual support. , improve the quality, and develop together, and play an important role in promoting the improvement of the strength of colleges and universities [14].

This paper applies Augmented Reality (AR) and Virtual Reality (VR) technology to the innovation of college English teaching mode to promote the improvement of English teaching quality and effectively promote the intelligent reform of modern education.

3. Intelligent VR/AR Teaching Technology

This paper applies VR/AR technology to English teaching to promote teaching model innovation through intelligent identification methods.

The system constructed in this article can achieve real-time recognition of the English teaching process, capture the teaching process of teachers and students in real time, discover various problems in teaching, and provide reliable decision support for the formulation of teaching strategies. It can also simulate the teaching process, analyze the teaching process through intuitive methods, simulate the formulated teaching decisions, and analyze the effectiveness of teaching strategies.

3.1. Intersection of Rays

The 3D scene is usually stored in an index structure, and the leaf nodes of the index store the corresponding primitives. Common primitive shapes include sphere, cuboid, plane, triangle, etc. In addition to this, other complex shapes are usually triangulated, and only triangles are stored in the scene. Primitives are generally stored through implicit surfaces, rays are stored as vectors with positions, and the vectors are intersected with implicit surfaces.

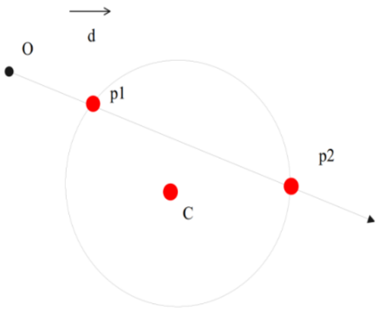


Figure 1. Ray-sphere intersection.

As shown in Figure 1, the expression of ray $\vec{r}$ is $\vec{r} = O + t\vec{d}, O$ is the starting point of the ray, $\vec{d}$ is the direction of the light source, and t is the parameter of the ray stepping. If C is the midpoint of the sphere and p is a point on the sphere, the expression for the sphere is $(P\text{-}C)^2+r^2$. By putting the vector ray into the sphere expression, we get:

$$\vec{d}^2 t^2 + 2(\overrightarrow{(C-O)} \cdot \vec{d})t + \overrightarrow{(C-O)}^2 - r^2 = 0 \quad (1)$$

The Graphics Processing Unit (GPU) rendering pipeline uses triangles as primitives for rendering, and various existing 3D models are also saved based on triangles. To perform ray tracing on an existing 3D model, a ray-triangle intersection operation must be performed on the triangles [11].

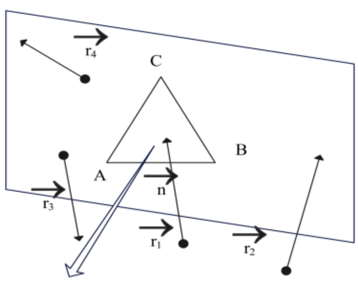
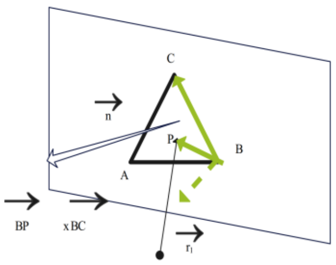


Figure 2. Ray-triangle intersection.

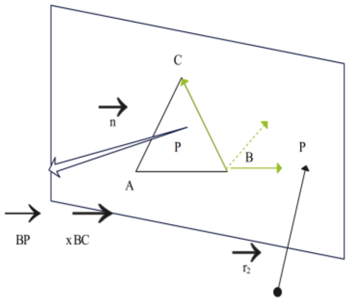
As shown in Figure 2, there are four kinds of positional relationship between light $\vec{r_1}, \vec{r_2}$ and the triangle in space. intersects the plane where the triangle is located, $\vec{r_2}$ intersects inside the triangle, $\vec{r_1}$ intersects outside the triangle, $\vec{r_3}$ is parallel to the triangle, and $\vec{r_4}$ faces away from the triangle [16].

$$t = \frac{\vec{n} \,.\, \vec{O}A}{\vec{n} \,.\, \vec{d}} \quad (2)$$

The intersection point P of the ray and the plane where the triangle is located can be combined with the analytical expression $\vec{n}.\,(x\text{-}A)=0$ of the ray and the plane where the triangle is located, A is the vertex of the triangle, and x is any point in space. Substituting the expression $\vec{r} = O + t\vec{d}$ for light into it, Equation (3) can be obtained. After that, by substituting t back into the ray expression, the intersection point P can be obtained.



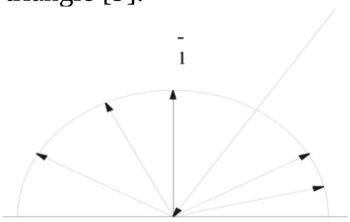
a) The intersection point is within the triangle.



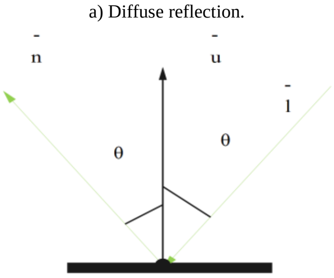
b) The intersection point is outside of the triangle.

Figure 3. The intersection of the ray and the triangle.

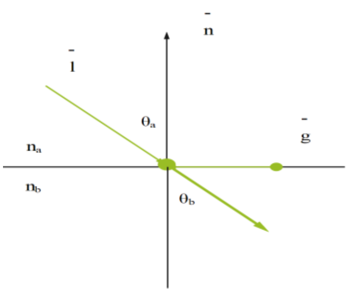
As shown in Figure 3, the cross product can be used to judge whether the intersection point is inside or outside the triangle. The cross product of two vectors in the triangle plane can obtain the vector perpendicular to the triangle. We do the cross product with the vector from the vertex of the triangle to the intersection P, and the vector from that vertex to the next counterclockwise vertex of the triangle [9].



a) Diffuse reflection.



b) High-level light reflection.



c) Refringence.

Figure 4. Reflection model.

According to the principle of micro-surface element, the diffuse reflection of light will disperse the incident light energy along the hemisphere of the object surface, as shown in Figure 4-a). If the path of an incident ray is traced, an infinite number of diffuse rays need to be traced. Therefore, it is necessary to handle the ray path tracing of diffuse reflection by Monte Carlo integration.

Specular reflection and refraction are calculated directly according to Snell's law, and the most realistic effect can be obtained, as shown in Figure 4-b). According to the basic linear algebra formula, the reflected light direction $\vec{u}$ of the specular reflection can be obtained, as shown in Equation (4). Among them, $\vec{l}$ is the direction of the incident light, specular reflection will reflect all incident radiance, and $\vec{n}$ is the normal [17].

$$\vec{u} = 2(\vec{l}\,.\vec{n})\vec{l} - \vec{l} \tag{3}$$

As shown in Figure 4-c), the medium where the incident light is located is n_a, and the medium where the refracted light is located is n_b, then the refractive index is $c=n_a/n_b$, and the refracted light direction $\vec{t}$ is [2]:

$$\vec{t} = c(\vec{l} + (\vec{l}\cdot\vec{n})\vec{n}) - \sqrt{1-\left(1-(\vec{l}\cdot\vec{n})^2\right)c^2}\,\vec{g} \tag{4}$$

Among them, $\vec{g}$ is the unit vector parallel to the ground and $\vec{n}$ is the normal. Since the incident light is also reflected on the surface of the refracting medium, the radiance of the incident light will be divided into the refracted light and the reflected light at the same time, and the ratio of the energy of the two sides is determined by the following equation:

$$\mathrm{Fr}(\theta_a) = F_0 + (1-F_0)(1-\cos\theta_a)^5 \tag{5}$$

Among them, $Fr(\theta_a)$ is the proportion of reflected light energy, F_0 is the reflected energy ratio when incident from the normal direction, $F_0=(c-1)^2/(c+1)^2$. In addition, when the light is emitted from the medium to the outside world, the exit angle may be greater than $2/\pi$. At this time, no refraction will occur, only emission will occur, that is, when $cos\theta_b<0$, total reflection will occur.

Since the diffuse reflection rays may be distributed in the entire hemisphere at the intersection of the incident light and the object, even a single ray may have multiple diffuse rays in the entire hemisphere due to the microfacet effect, the irradiance cannot be calculated by accurately tracing the path of a diffuse ray. At this time, the Monte Carlo integration method is required to perform sampling approximation:

$$E\left[F_N\right] = E\left[\frac{1}{N}\sum_{i=1}^{N}\frac{f(X_i)}{p(X_i)}\right] = \int_a^b f(x)dx \tag{6}$$

In Equation (7), the expected value of the function F_N is equal to the function $f(x)$ to be estimated, and X_i is the random probability distribution function. The advantage of Monte Carlo integration is that the number of samples

N can be chosen arbitrarily and is independent of the dimension of $f(x)$ [8].

3.2. Interactive Ray Tracing

Figure 5 is a schematic diagram of combining a software model with hardware. In the kernel function, it is also necessary to obtain the thread number and pixel coordinates of the current thread according to the grid dimension and block:

$$T_{id} = \left(B_{idx} + B_{idy} * G_{\dim x}\right) * \left(B_{\dim x} * B_{dimy}\right) + \left(T_{idy} * B_{dimx}\right) + T_{idx} \quad (7)$$

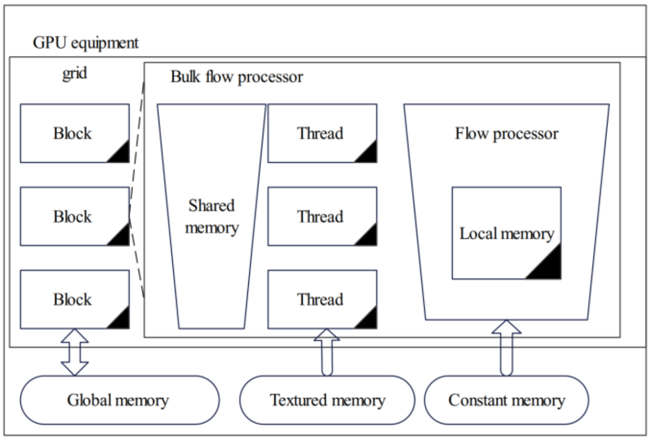


Figure 5. CUDA software and hardware model.

Among them, T_{id} is the total thread number, B_{idx} and B_{idy} are the serial numbers of the block on the x and y axes, B_{dimx} and B_{dimy} are the dimensions of the block, and T_{idx} and T_{idy} are the serial numbers of the threads in the block. The process of finding the total thread number is similar to finding the linear ordinal number of elements in a multidimensional matrix. Since the grid dimension is obtained according to the resolution, the arrangement of the internal blocks of the entire grid is similar to that of a real display screen. The pixel coordinates (x, y) can be calculated according to the block number and the thread number in the block using the following equation:

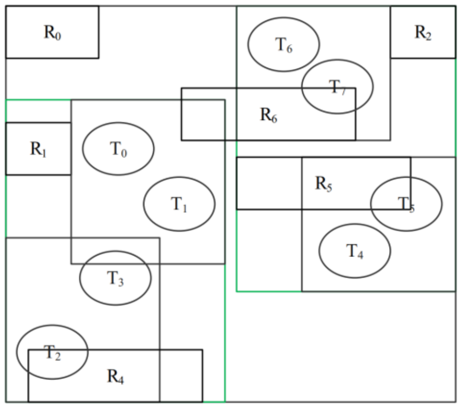
$$x = B_{idx} * B_{\mathrm{dimx}} + T_{idx} \quad (8)$$

Figure 6 shows a schematic diagram of a two-dimensional hierarchical bounding box. A bounding box is an axis-aligned box outside a fragment, whose outer boundary intersects the fragment, enclosing the fragment inside. The bounding box is organized in layers, that is, the level bounding box, as shown in Figure 6-a). Hierarchical bounding boxes are stored using a tree-like data structure, as shown in Figure 6-b).

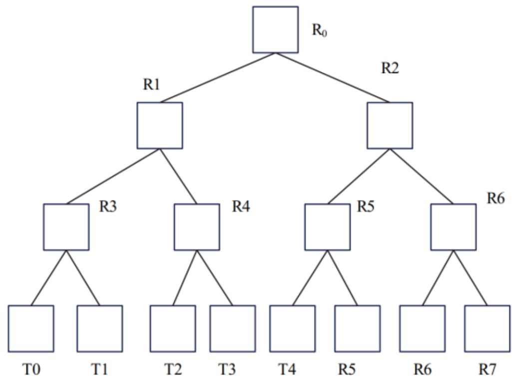
The division based on Surface Area Heuristic (SAH) method can better avoid the above two problems. This method uses a cost function to evaluate the division plane, and the cost function is:

$$x = B_{idx} * B_{dimx} + T_{idx} \quad (9)$$

Among them, n_A is the number of primitives in the A area, S_A is the area of the bounding box of the A area, and the B area is the same, and the plane with the smallest valence function is replaced for separation.



a) Hierarchical enclosure box.



b) Hierarchical enclosure box three.

Figure 6. Schematic diagram of a two-dimensional hierarchical bounding box.

The depth of field effect can be simulated by adding aperture and focal length to the camera. As shown in Figure 7, in a camera with aperture and focal length, the starting point of the camera light is no longer just the point where the camera is located, but is randomly distributed within the range of the aperture. The end of the ray is also not on the image plane, but on the focal plane, the calculation equation of the camera ray $\vec{d}$ is:

$$\vec{d} = \left(P_f + i * \vec{cx} + j * \vec{cy}\right) - \left(P_C + A(\vec{ax} * \cos\xi + \vec{ay} * \cos\xi)\right) \quad (10)$$

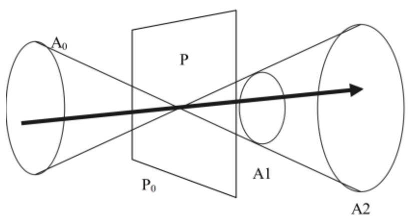


Figure 7. Aperture and focal plane.

In Equation (12), P_f is the center of the focal plane, i, j are the pixel coordinates on the focal plane corresponding to the image plane, $\vec{cx}, \vec{cy}$ is the coordinate base vector of the focal plane, and the first half of the formula calculated is the end of the light on the focal plane. P_c is the position of the camera, A is the aperture size, ξ is a random number, $\overrightarrow{ax}, \overrightarrow{ay}$ is the unit vector of the camera coordinate system, and the point calculated in the second half is a random point within the aperture, which is the starting point of the camera light. A uniform random distribution can be concentrated to the center of the origin, and its formula is:

$$T(\xi_i) = \begin{cases} \sqrt{2\xi_i} - 1, 2\xi_i < 1 \\ 1 - \sqrt{2 - 2\xi_i}, 2\xi_i \geq 1 \end{cases} \quad (11)$$

Among them, ξ is the original uniform random sampling distribution.

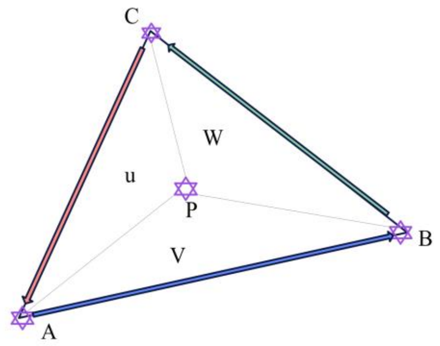


Figure 8. The barycentric coordinates of the super-sampled sub-pixel distribution triangle.

The barycentric coordinates are weighted by the area of the inner triangle, and the vertices of the triangle are weighted like this. Storing geometry visibility functions, such as the implicit expression function for each triangle, requires a lot of memory. As shown in Figure 8, the barycentric coordinates of the point p on the triangle are p=wA+uB+vC, u+v+w=1, and the range of each component is between [0, 1]. We can get:

$$\left[-\vec{d}\,\overrightarrow{AB}\,\overrightarrow{AC}\right]\begin{bmatrix} t \\ u \\ v \end{bmatrix} = \overrightarrow{AO} \quad (12)$$

Equation (14) can be solved using Cramer's rule:

$$\begin{bmatrix} t \\ u \\ v \end{bmatrix} = \frac{1}{\vec{P}\cdot\overrightarrow{E_1}}\begin{bmatrix} \vec{Q}\cdot\overrightarrow{E_2} \\ \vec{P}\cdot\vec{T} \\ \vec{Q}\cdot\vec{d} \end{bmatrix} \quad (13)$$

Among them, $\overrightarrow{E_1}$ is $\overrightarrow{AB}$, $\overrightarrow{E_2}$ is $\overrightarrow{AC}$, and $\vec{T}$ is $\overrightarrow{AO}$, $\vec{P} = \vec{d} \times \overrightarrow{E_2}$, $\vec{Q} = \vec{d} \times \overrightarrow{E_1}$ and this expression can calculate barycentric coordinates with as few intermediate vectors as possible.

Russian roulette is a scheme that reduces the number of sampling points and only calculates the sampling points that contribute more to the scene. Direct lighting is considered:

$$L_o(\omega_o) = \int_\Omega f(\omega_i, \omega_o) L_i(\omega_i) \,|\cos\theta|\, d\omega_i \quad (14)$$

Among them, ω_i is the incident light, ω_0 is the outgoing light, L_i is the incident radiance, L_0 is the outgoing radiance, f is the bidirectional reflection distribution function corresponding to the illumination model, and Ω is the hemispherical space where the intersection point is located. When using 100 sample points calculated by the $p(\omega)$ probability distribution function within a single pixel, the Monte Carlo estimation function is:

$$\frac{1}{100}\sum_{i=1}^{100}\frac{f(\omega_i, \omega_o) L_i(\omega_i) |\cos\theta_i|}{p(\omega_i)} \quad (15)$$

The main computational cost of the summation function comes from the iteration of ray tracing. The main part that affects the value of this function is the bidirectional reflection distribution function f, and $|\cos\theta_i|$ also affects the value of this function. When the calculated value of f is small in one tracking, the irradiance of subsequent tracking is usually only smaller, or when ω_i is incident in a direction close to the horizontal line, $|\cos\theta_i|$ is also small. If the above two cases are directly ignored, bias will be introduced, so it is necessary to stop the next tracking according to the probability q in the above two cases according to the idea of Russian roulette. q is an empirical set value, called the probability of interruption, and the following equation is the formula of Russian roulette:

$$F' = \begin{cases} \dfrac{F - qc}{1 - q}, \xi > q \\ c, \xi \leq q \end{cases} \quad (16)$$

Among them, F is the selected value, the calculation result of f is selected in the algorithm, c is a constant, and the radiance L_0 currently tracked is selected in the algorithm. When the number of ejections of ray tracing exceeds 5 times, the calculation of Russian roulette will be performed, a random value c will be randomly generated, and the probability of F will be calculated according to the above equation. When it is within the probability q, F is not calculated, but directly uses the constant value ξ. When it is not within the probability q, the weighted calculation of F is performed to maintain an unbiased calculation.

3.3. Voxel Cone Tracking

The image quality of ray tracing is the closest to reality, however, it cannot reach real-time rates due to its time consumption. As mentioned in the introduction, global illumination mainly depends on the acceleration structure and the light transmission method based on this structure. To calculate global illumination under limited hardware conditions, it is necessary to rely on a simplified spatial structure and a discretized illumination transmission method.

For the convenience of description, the voxel structure is separately named as attribute body, marker body and radiator according to the value stored in the voxel. The 3D texture where the albedo, normal and emissive values are located is the property body. Additionally, the occlusion values computed during the voxel lighting phase are also stored in the attribute body. The outgoing radiance is stored in the radiator, which is calculated in the voxel lighting stage, and is used to calculate the value of indirect lighting in the voxel cone tracking stage.

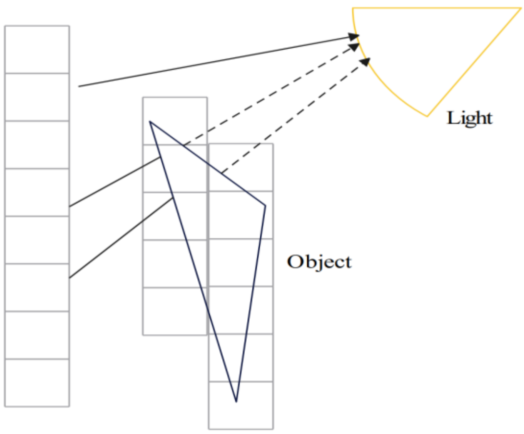


Figure 9. Voxel raycasting.

The visibility judgment is mainly to see whether the light source to the voxel is blocked. As shown in Figure 9, a ray can be cast at the light source on the voxel. According to the marker body, it can be used to judge whether the voxel is a solid voxel, and if it is not a solid voxel, the translucent value of all voxels on the light path is accumulated as the attenuation value of the light source reaching the voxel. Direct lighting is not calculated if there are solid voxels on the path. The projected ray adopts the way of ray stepping. The light steps a distance of one voxel at each step, and a judgment and accumulation are made at each step. The accumulated transparency value is equivalent to the occlusion value on the path from the light source to the voxel, and can also be used to calculate soft shadows and ambient occlusion.

$$V_i = V_{i-1} + \frac{\alpha_i \left(1 - V_{i-1}\right)}{i * d} \tag{17}$$

In Equation (19), V_i is the occlusion value of the *i-th* step, α_i is the translucency value stored by the voxel at that location, and d is the modulus of the vector of the voxel along the light source direction. Because occlusion occurs mainly at close range, light may bypass distant occlusions in indirect reflections. Therefore, the further away from the voxel, the smaller the weight of the translucency value.

After calculating the visibility, you need to calculate the attenuation coefficient of the light source. Ambient light is calculated in the same way as ray tracing. The attenuation of the directional light is by emitting a ray in the opposite direction to the directional light, and the shading value accumulated by the step of this ray is used as the attenuation coefficient. Because the algorithm in this chapter is a biased algorithm, the calculation of indirect lighting is not complete. Therefore, this paper adopts a point light source model with more attenuation coefficients:

$$L_i = \frac{I * C}{K_c + K_l * r + K_q * r^2} \tag{18}$$

Among them, K_c, K_l, K_q is the constant attenuation coefficient, the first attenuation coefficient, the second attenuation coefficient, I is the light intensity, C is the light color, and r is the distance from the surface of the object to the light. This empirical formula can more easily adjust the attenuation curve of the light source, so that the attenuation of the point light source, which is completely inverse quadratic curve, appears as a linear attenuation at a long distance. At longer distances, the under-computation of indirect lighting is compensated for by more direct lighting.

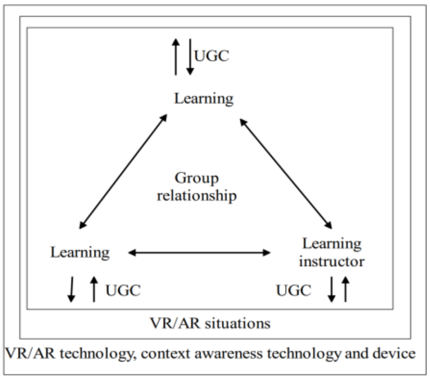
4. Teaching Experiment Analysis

4.1. Methods

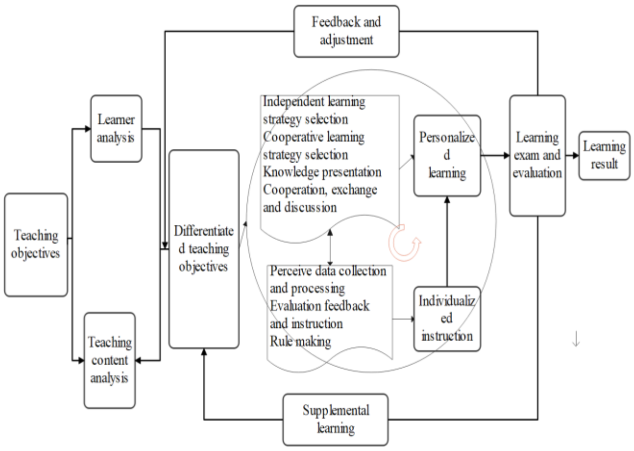
Teaching objectives are the basis for teaching implementation and teaching evaluation. The setting of teaching goals should not only consider the students' actual learning ability, original knowledge level and cognitive ability, etc., but also combine the training standards of the Ministry of Education for the professional talents and the society's post demand for talents. According to learner analysis, teaching content analysis, and teaching strategy formulation, the teaching objectives are again decomposed into progressive differentiated teaching objectives, and a progressive design is made for the amount of information and the presentation of information when constructing VR/AR scenarios. At the same time, according to the VR/AR situational awareness data output and learning evaluation, etc., the level of knowledge mastered by students is dynamically assessed, and the differentiated teaching objectives are adjusted in stages for re-learning, and finally the teaching objectives are achieved. Figure 10 shows the innovation of college English teaching mode from the perspective of VR/AR technology.

Using modeling tools such as 3DSMAX and introducing the efficient Unity3D development engine, the project proposes to develop an English simulation teaching system based on VR/AR.

Before the client system starts running, the server-side program enters the running state and maintains a connection with the database. After the client is started, students can enter the English simulation teaching system by registering or logging in; After entering the platform through different client ports, the human-computer interaction method corresponding to the client is used to interact with the scene. Firstly, select teaching equipment, and then choose a mode for virtual simulation experiment learning; Then, through the interaction of three-dimensional virtual models, the virtual learning process of students is intelligently evaluated.



a) Conceptual model of information ecosystem for VR/AR learning context.



b) Teaching mode based on VR/AR situation from the perspective of information ecology.

Figure 10. Innovation of college English teaching mode from the perspective of VR/AR technology.

4.2. Results

After the above model is constructed, the effect of the college English teaching model under the perspective of VR/AR technology is verified, and its practical teaching effect is counted. Finally, the simulation teaching test results shown in Table 1 are obtained.

Table 1. Verification of the effect of teaching mode.

Number	Teaching mode	Number	Teaching mode
1	82.03	19	79.18
2	78.74	20	85.90
3	84.72	21	85.99
4	81.99	22	78.24
5	84.71	23	81.90
6	81.33	24	84.38
7	85.54	25	84.06
8	82.76	26	82.83
9	78.79	27	84.91
10	78.34	28	84.20
11	78.72	29	81.03
12	83.09	30	83.04
13	81.89	31	80.02
14	81.26	32	82.09
15	79.36	33	85.03
16	81.32	34	80.14
17	84.83	35	82.35
18	79.44	36	84.15

4.3. Analysis and Discussion

It can be seen from Table 1 that the college English teaching model based on VR/AR technology proposed in this paper can effectively improve the effect of English teaching.

In addition to teaching simulation, the system can also provide immersive teaching experiences for teachers and students.

Fully utilize various teaching media such as VR/AR technology, as well as information technology and digital resources, and focus on the application of VR/AR technology in the classroom and after class to enhance students' experience, improve plans, identify shortcomings and gaps, and construct an integrated teaching model through tasks and activities.

Before class, teachers send task books, resource packages, and knowledge points related to the course through the teaching resource platform. Require students to download and complete tasks using a terminal.

During class, teachers provide feedback on pre class tasks and encourage students to use network simulation software. You can make rich and substantial multimedia courseware materials in advance, and use Internet technology to find pictures, videos or explanation videos related to interior design knowledge. The practice process is conducted in the form of an operational competition, which is a self-directed learning and collaborative exploration process. Truly achieving 'learning by doing, practicing by doing'.

Teachers use AR platforms to showcase and explain, as AR, as an augmented reality technology, can provide students with a variety of immersive and intuitive experiences. By utilizing forms such as peer evaluation and grading, we aim to maximize students' teamwork and cooperation skills, cultivate their professional abilities, and enable them to learn happily.

After class, by establishing interest groups and VR/AR clubs, and regularly conducting themed activities, students can fully utilize VR/AR methods to enhance their learning abilities.

5. Conclusions

With the continuous development and progress of artificial intelligence technology, in terms of knowledge mastery and skill education, the traditional teaching model will gradually introduce more technological means and methods to improve time utilization. The intelligent teaching mode is to break the knowledge instillation teaching mode in teaching, and rebuild a scientific and standardized educational form according to the needs of education and teaching in the new era. Moreover, people are paying more and more attention to artificial intelligence education, and artificial intelligence education is gradually reshaping the process of education, promoting the development of education towards intelligence, precision, personalization and diversification. This paper applies VR/AR technology to the innovation of college English teaching mode, promotes the improvement of English teaching quality, and effectively enhances the intelligent reform of modern education. It can be seen from the simulation experiments that the college English teaching mode based on VR/AR technology proposed in this paper can effectively improve the effect of English teaching.

Funding

The research is supported by: Anhui Provincial University Quality Engineering Project(2020jyxm1114).

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