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# Technology to Assist the Application and Visualization of Digital Media Art Teaching

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***Abstract:***

Based on the assistance of artificial intelligence and virtual reality technology, we have conducted in-depth research on digital art education and visualization, starting from the artistic beauty of virtual technology in the new media environment. The virtual beauty and traditional art are different. This article studies the mutual performance of virtual reality technology and art. Virtual art has its unique characteristics. Breaking through traditional forms of expression, technology and art complement each other in the digital information trend, expressing a unique artistic personality. Use artificial intelligence combined with virtual reality technology as an auxiliary teaching tool to complete the basic course teaching of digital media art; combine three-dimensional animation courses with virtual reality technology to improve the teaching effects of professional skills courses; combine virtual reality technology with professional practical training projects. Combining practice to promote the comprehensive improvement of students' professional skills.

***Keywords****: Artificial Intelligence, Virtual Reality, Digital Media Art,Teaching Application, Visualization.*

## I. INTRODUCTION

Science and technology and traditional art have gradually developed and grown under the trend of the times. In the field of art, new media art is a new art form that is in line with the pace of development of the times, but it is different from traditional art [1]. The original single painting art has many different forms under the influence of new media, from static expression to dynamic artistic display, from the passive appreciation of aesthetics to mainly accepting artistic beauty. In the context of new media, virtual and interactive art has emerged [2]. This article is derived from the interactive research on virtual technology and art in the new media environment today [3]. Its background lies in the rapid development of computers and the impact of virtual technology that will usher in it, which gives rise to various fields [4]. Therefore, the development of virtual roaming technology and art combination is accompanied by the impact of artistic pictures and the convenience brought by functions [5]. The virtual reality technology in the new media environment produces a piece of digital information and a virtual world system under the computer system, which includes computer graphics, computer simulation, artificial intelligence, human-machine interface, multimedia, network technology, and other technologies [6]. Through today's hardware and software equipment and auxiliary equipment, users can not only see, hear, feel, but also communicate and experience each other, and at the same time create a virtualized information environment [7]. Virtual

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reality technology has been used in military, education, construction, civil engineering, entertainment, and other fields in the early days, and has achieved excellent results [8]. Due to the rapid changes in the times, traditional concepts can no longer meet the needs of the people today, and what follows is a digital technological revolution. Technology leads to the trend of the times. Science and technology are constantly eroding people's thoughts and lives, making life more colorful. However, the forms of art have also changed with the development of science and technology, and the art displayed in technology has become the latest artist [10]. At the same time as the development of information technology, virtual technology is widely used, not only in movies and games. The construction of digital virtualization will shorten the distance between people. This is not only for browsing but also for close contact with people who do not understand virtual technology. At the same time, there are also many novelties in artistic expression.

Checa's simulation of physical reality first tried to make a flight model simulator, and successfully realized people's desire to fly [1]. Malik developed a motorcycle simulator and realized the real feeling of roaming Manhattan, which is representative [12]. Maas has successfully developed a head-mounted display that can display 3D computer images and track the movement of the user's head [13]. It is called the "Sword of Damocles." Although it is large, the user has already been exposed to the interaction of the handle [14]. The Eye Phone, a virtual reality device developed by Papanastasiou, became the world's first market-oriented VR device [15]. Zheng et al. proposed the concept of a convolutional neural network and proposed the backpropagation algorithm of the neural network, which is historical significance and value [16]. Gorecki et al. published new research results in important journals of Science [17]. They believe that neural networks with multiple hidden layers have stronger learning capabilities for features and that stepwise initialization of each layer can reduce the complexity of training models. Since then, deep learning has developed rapidly, and it has also received more attention and research [18]. A great feature of CNN is its weight sharing mechanism. Most of its input is changes in space rather than time, so the image is a typical example, and its spatial data performance is very good [19]. However, the changes in the sample sequence in time sequence cannot be modeled in real-time data. This is also the shortcomings and deficiencies of CNN in terms of time and space. To solve the problem of time-domain sequence data, Recurrent Neural Network (RNN) was proposed. It has a special network structure. The input at the current time point is directly applied to itself by the output of the previous neuron. It can be realized that all historical moments and the output of the network are the results of the input of that moment, to achieve the purpose of modeling the sequence. Miller et al. then proposed a convolutional neural network, which is not completely suitable for learning time-series data [20]. If only the convolutional neural network is used to learn these data sequences in the time domain, supplementary processing is needed, and the effect cannot be guaranteed. Recurrent neural networks are usually more suitable for time-series sensitive tasks.

Through the combing of the concept of vitality, the basic meaning of virtual art is clarified, and the creative methods, aesthetic characteristics, and appreciation methods of virtual art are further considered: What kind of influence does a creative effect from technology have in the entire art activity? What are its value and significance? Understanding and grasping virtual art from the perspective of advancing with the times, when analyzing and discussing it, not only can put forward a rational reflection on virtual technology itself, but also enrich the new content of research in the field of aesthetics and literature. The research of virtual art in the digital age involves not only the technical field but also the aesthetic field; the

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research on the creation and appreciation methods of virtual art also needs to be carried out through comparison with traditional art. Therefore, multi-disciplinary theories, such as computer graphics, design, aesthetics, literature, and other disciplines, methods, and results are used to comprehensively study virtual art, and then more comprehensively grasp the characteristics and nature of virtual art. Summarize and draw on the research methods and research ideas from the numerous existing documents related to virtual art research, further understand the current situation of the virtual art research and establish a preliminary understanding of virtual art. A comparative study of virtual art and traditional art in terms of creation methods, creation concepts, appreciation methods, and aesthetic concepts is conducted to analyze where the similarities and differences are manifested, and further clarify the characteristics of virtual art.

## II. TEACHING DESIGN ASSISTED BY ARTIFICIAL INTELLIGENCE AND VIRTUAL REALITY TECHNOLOGY

### 2.1 Artificial intelligence combined with virtual reality algorithm analysis and design

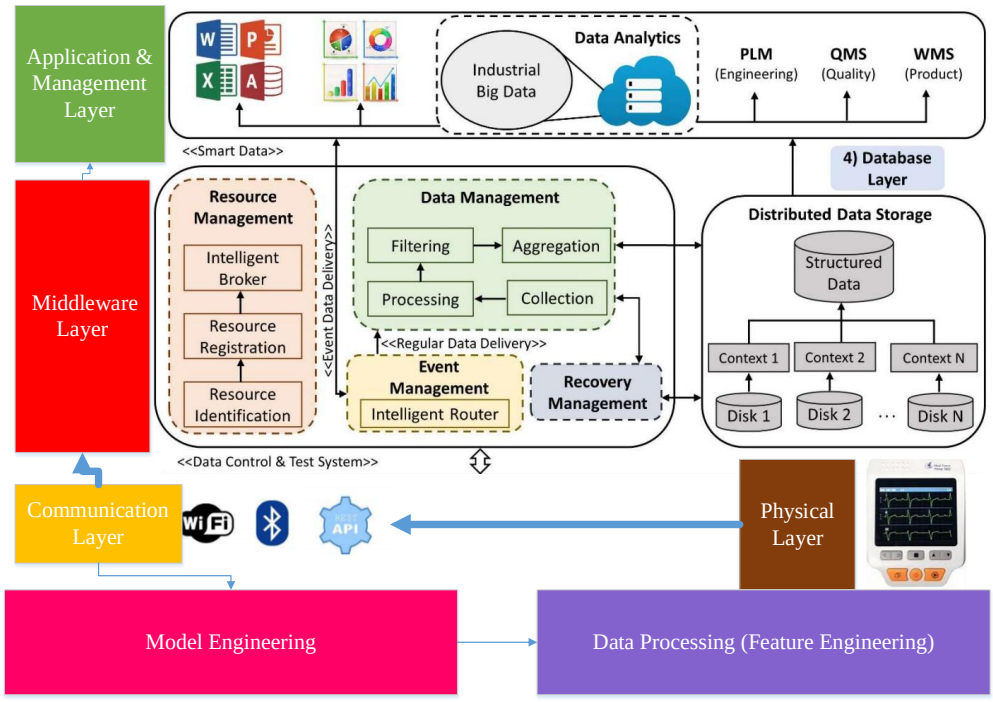


**Fig 1. Artificial intelligence algorithm structure**

This research mainly uses the optimization of Batch Normalization. Batch Normalization, as an important research result of deep learning in recent years, has been widely proven its effectiveness and importance for neural network optimization. In the process of forwarding and backward propagation of the neural network, as the parameters of the hidden layer change, the output distribution of the hidden layer will change. This is the "Internal Covariate Shift" problem [21]. In the process of neural network training, each hidden layer will face the "Internal Covariate Shift" problem. That is to say, the input distribution of each hidden layer changes during the training process of the neural network, which makes the neural network unable to be stable. Learning rules, which is why as the depth of the neural network increases, training becomes more difficult, and convergence slows down. As shown in Fig 1, based on previous

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studies, it is found that if the input data is whitened in image processing (whitening operation refers to transforming the input data distribution to a normal distribution with a mean value of 0 and a variance of 1), the neural networks, the speed of convergence will increase [22]. So, I thought of normalizing the input of each hidden layer in the training process of large neural networks.

In the training phase, Batch Normalization is performed on the input of each hidden layer. For mini batch SDG, one training contains m training examples. First, calculate the mean n and variance I of these m training examples Mi:

$$M_i = \frac{1}{N}\sum_{n=1}^{N} M_i^2(T_n) \tag{1}$$

$$M_i^2(T_n) = \sum_{n=1}^{N} I_i^2 \tag{2}$$

Then the input of the hidden layer is transformed as follows:

$$Y = \sum_{ij=1}^{m} \frac{n_{ij} - n_{ij\min}}{n_{ij} - n_{ij\max}} W_{ij} \tag{3}$$

W is the Y score of Mi. Considering that σ maybe 0, we make a little improvement based on the above and add a small number m to the denominator. The formula is as follows:

$${}_a^G D_t^v f(t) = \lim_{h\to 0} \frac{1}{h^v} \sum_{m=0}^{\left[\frac{t-a}{h}\right]} (-1)^m \frac{\Gamma(v+1)}{m!\Gamma(v-m+1)} f(t-mh) \tag{4}$$

However, if the distribution of all hidden layer inputs meets the standard normal distribution, the learning ability of the neural network will decrease. Therefore, you can do scale and shift transformations:

$$k_{nn}(x) = \sum_{i=1}^{N} w_i s_i(x) = W^T S(x) \tag{5}$$

W and S are network parameters, which can be learned through training so that they can be changed according to the needs of the networks that the input of the hidden layer obeys different distributions, so the complete transformation of Batch Normalization is as follows:

$$D_\varepsilon(x(t)) = \left[ s\left( \left\| x(t) - \ell_{j1} \right\| \right) \right] \tag{6}$$

The emergence of the net has brought deep learning to a climax once again. Its most important feature is that the model automatically learns features through data-driven, without the need to manually extract features. But different models can extract different features, and the quality of features directly affects the accuracy of prediction. In theory, the deeper the network, the stronger the representation ability, so the

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depth of the network is essential for learning to express more complex features. However, simply increasing the depth of the network will cause the gradient to explode or disappear. This is because as the number of layers in the network increases, the gradient of the backpropagation in the network will become unstable with the multiplication, making the gradient particularly large. The easiest way to increase the depth of the network is the disappearance of the gradient. To overcome this problem, many methods have been devised. The disappearance of the gradient has been solved to a certain extent. But another problem with increasing network depth is the problem of network degradation, that is, as the network depth increases, the performance of the network will get worse and worse, which is directly reflected in the decrease inaccuracy on the training set and test set. The identity block can be defined as:

$$\omega_i = \sum_{j=1}^{n} b_{ij}(i,\ j = 1, 2, \ldots n) \tag{7}$$

The first is forward propagation, assign weights to the previous time step at and the current input gi and activate them;

$$g_i = \omega_i / \sum_{j=1}^{n} \omega_i, \sum_{i=1}^{n} g_i = 1 \tag{8}$$

Pass at to the next time step, and output bij through the SoftMax layer;

$$b_{ij} = \frac{b_{ij}}{\sum_{k=1}^{n} b_{kj}(i,\ j = 1, 2, \ldots n)} \tag{9}$$

The last is backpropagation, which receives the gradient date of the next time step for backpropagation.

$$Q_N(w) = \frac{1}{2}\sum_{i,j} (1 - \mathrm{P}_{ij})^2 (\mathrm{m}_i - \mathrm{m}_j) \tag{10}$$

$$Q_N(w) = \mathrm{w}^T X L_N \mathrm{X}^{\mathrm{T}\,\mathrm{w}} \tag{11}$$

$$Q(w) = \frac{Q_N(w)}{Q_L(w)} = \frac{tr(\mathrm{w}^T X L_N \mathrm{X}^{\mathrm{T}\,\mathrm{w}})}{tr(\mathrm{w}^T X L \mathrm{X}^{\mathrm{T}\,\mathrm{w}})} \tag{12}$$

$$Q_N(w) = \frac{1}{2}\sum_{i,j} \mathrm{P}_{ij}(1 - \mathrm{P}_{ij})^2 + \left\| w^T X_b \right\|_2^2 \tag{13}$$

This paper proposes a new integrated time sliding LSTM network for action recognition, where integration means combining various input actions with attributes. The entire network is divided into three steps. First, we process the skeleton sequence data obtained from the previous processing and transform their coordinates based on scale, translation, and rotation to make all the action sequences get relative coordinates. The second step is that this article does not consider the joint coordinates as an entry point for research, but uses the human body to be affected by time differences when doing exercises for exploration,

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which helps our network focus on the actual skeleton movement. Finally, this article uses multiple LSTMs to divide the network into multiple periods for feature extraction and fusion. Finally, multiple LSTMs capture multiple motion dynamics through integration. Fig 2 outlines the overall idea of our model.

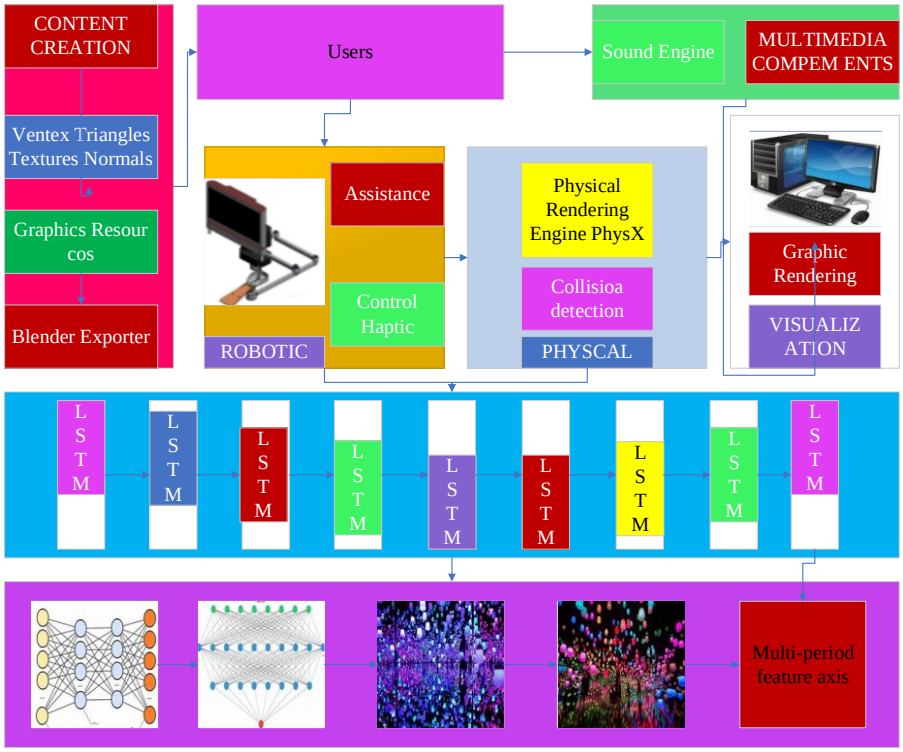


**Fig 2. Overview of the proposed artificial intelligence and virtual reality assisted teaching system**

When the skeleton is obtained, the original input skeleton can undergo orientation adjustment. In other words, even if the skeleton is in the same category in the same activity, the movement of the skeleton may have different properties due to the missal. To solve this problem, we need to convert the original coordinate system into a human cognitive coordinate system.

The linear activation function of each part is obtained through the cascade value, and the formula is calculated:

$$\delta = \sqrt{2\ln 2}\left(\frac{2^{\chi}+1}{2^{\chi}-1}\right) \quad (14)$$

$$e = \frac{(\varphi_{30}+\varphi_{03})^2 + 4\varphi_{22}^2}{(\varphi_{30}+\varphi_{03})^2} \quad (15)$$

$$\phi_{m,n} = \frac{\| q_{m,n} \|^2}{\delta^2}\exp\left(-\frac{(q_{m,n} * z)}{2\delta^2}\right) * \left[e^{i(q_{m,n}*z)} - e^{-\frac{\delta^2}{2}}\right] \quad (16)$$

$$\ln[L(\theta)] = \ln\left[\prod_{i=1}^{n} p_i^{y_i}(1-p_i)^{1-y_i}\right] = \sum[y_i(a+\sum_{j=1}^{m} x_{ij}\beta_j) - \ln(1+e^{a+\sum_{j=1}^{m} x_{ij}\beta_j})] \quad (17)$$

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Then through two fully connected layers, the extracted features are linearly combined. The advantage of the two layers is that the first layer combines the extracted features linearly, and the second layer is to achieve a high degree of nonlinear transformation of the input data objective, and then get the fully connected matrix.

### 2.2 System visualization design

After the database and collaborative filtering recommendation algorithm are implemented, it needs to be displayed on the web page, so the main process of designing the push display page in this paper is introduced. Web design can be divided into three layers for development: presentation layer, logic control layer, and the data layer. The data layer creates transmission objects that can be transmitted to the database, that is, creates a class corresponding to the form in the database. The logic control layer is mainly to edit the operation process of how to store, update, and delete data, and set the return value or threshold to make logical judgments. Finally, the presentation layer feeds the processed data back to the user by obtaining the data and parses the corresponding HTML, JavaScript, and other front-end code to render the page, and finally presents it to the user.

When the files are conFigd, the intelligent display system is designed according to the three-layer architecture of the presentation layer, the logic control layer, and the data layer. As shown in Fig 3.

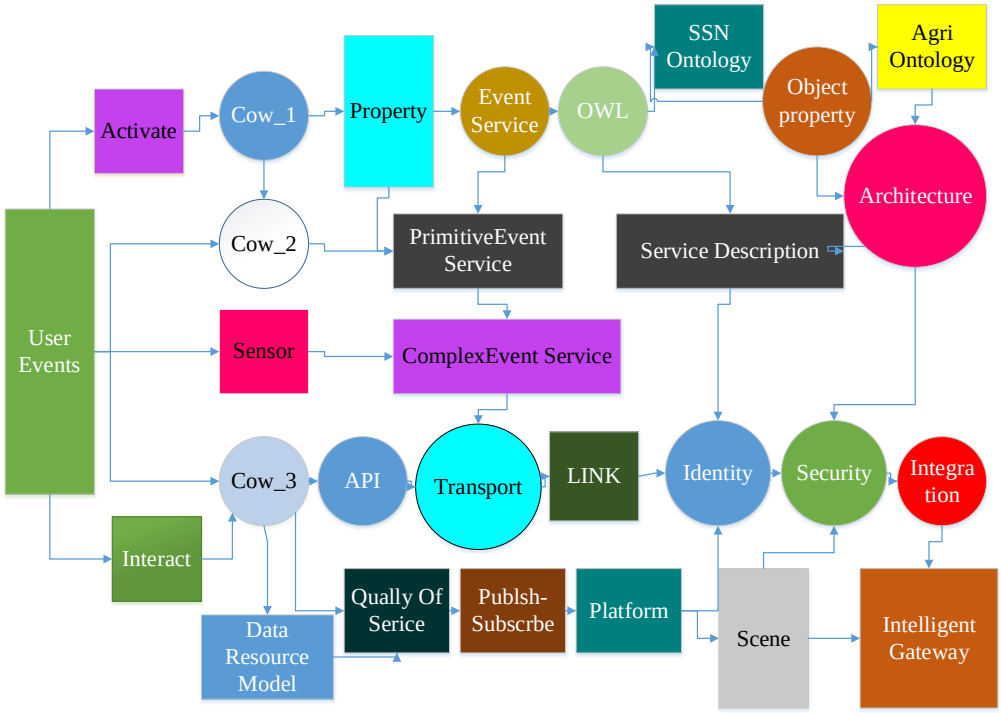


Fig 3. Visual design

When the front end interacts with the user, the visual page is displayed, and the user operation page will send a request to the server. The background will call the service layer and other processing steps according to the relevant business logic designed to process, and call the corresponding method. When a series of operations such as adding, deleting, modifying, and searching data needs to be performed, such as saving or

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deleting collected data such as a user's interest degree parameter or character shape, the database is called to complete. When the response is returned after the background is completed, the browser gets the HTML code, parses the HTML code, requests the resources in the code, and renders the page and finally presents it to the user.

The test of the intelligent display system is to build an environment by simulating a small booth and perform functional tests according to the exhibitor's participation process. According to the design block diagram of the overall scheme of the display system, tests are performed according to the functions divided by the modules, namely, test from the following three aspects: based on the recognition and perception module of the Internet of Things, Fig extraction based on image processing, and page display based on recommendation algorithm.

The creative thinking mode of traditional art is mainly manifested in imagination and fiction, which is related to the creator's creative ability and talent; while the thinking mode of virtual art, creation is carried out using digital technology and media. In the specific creative practice, on the one hand, the technical and instrumental connotation of digital virtual creation extends and expands the thinking and imagination of creators, making them constantly thinking about how to use new creative resources for artistic innovation; on the other hand, the effect produced by technical factors is reflected in the creator's brain, forming a way of thinking that simulates a technical effect to create. This way of thinking not only plays a role in the process of simulating and reproducing the real world but also has a subtle influence on the creation of a virtual world that has never appeared or cannot exist. The concept of creating reality and vitality gradually enters the creative thinking of artists, not only for the realistic reproduction of the real world but also for the creation of "real" virtual images and spaces.

Virtual art is constantly exploring breakthroughs based on drawing lessons from traditional art expression and content. The new artistic language not only inherits and integrates the existing artistic language but also includes emerging artistic language arising from new creative methods. The artistic language of virtual art fusion is mainly manifested in two aspects, in the process of virtual art creation. The artistic language used includes not only the "infinite deconstruction and reintegration" of various traditional artistic expressions such as music, painting, drama, literature, architecture, etc. but also the virtual reality created by its digital media technology entering artistic creation. For example, in the creation of film and television art, digital stage art, etc., there are not only traditional artistic languages such as music and painting, but also technical languages used by digital technology to present traditional art, such as three-dimensional display language methods, voice input, and output language methods, etc. The second is the artistic language created by digital technology and network multimedia itself, such as digital interactive installation art, where the combination and installation, transformation and conversion, simulacra, and repetition, etc. Digital interactive installation art is a language form that is a mixture of multiple ideographic symbols such as sounds, pictures, and three-dimensional images. This fusion is essentially a deep level of various ideographic symbols. A more complex fusion of the above is also a new art language form recreated by the combination of digital technology and multimedia.

## III. DIGITAL MEDIA ART TEACHING DESIGN

### 3.1 Teaching content design

In education, it mainly lies in the systematic learning of knowledge, with students as the center, through the creation of a virtual teaching system, students can learn passively. To achieve an environment where everyone likes to learn, thereby promoting the formation of new knowledge. For example,

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contextual learning, experiential learning, collaborative learning, problem-oriented learning, inquiry-based learning, etc. Because they all have the same characteristics as the virtual learning environment, they can be widely used in the teaching of virtual reality environments. Virtual reality technology has just begun in the field of education and has not entered ordinary classrooms on a large scale. The two characteristics of "immersion" and "interaction" of virtual reality can truly simulate different learning environments. And you can conceive some things that are not available in the real world, and use the learning tools required by various disciplines to perform actual operations to achieve the purpose of learning. In the virtual education system, it can be divided into four types: observational learning, operational learning, social learning, and scientific research. In practical applications, these different application types are not mutually exclusive but can be combined in the same virtual learning environment.

The communication form of traditional art is publish-transmit-receiving. The traditional form is too single, and creators cannot receive all feedback from viewers. When the new media era came, the form of communication was changed, especially the network media, and the reply form of information transmission was realized. For example, the form of the network changed people's freedom to browse and choose their favorite things for detailed viewing, thus achieving network interaction is also the embodiment of the initial form of virtual performance. The interaction in virtual reality is more flexible and realistic, surpassing traditional art forms early, and virtual reality interactive art has become the mainstream in the new media environment. The interactive art displayed in virtual reality technology makes the form of virtual reality technology itself more diversified, and the visual senses, hearing, and tactile feelings are more realistic. The interaction between virtual reality technology and art is shown by the fusion of two different forms, and what is embodied is the desktop-style immersion, which enables the experiencer to feel the virtual art more realistically, as shown in Fig 4.

Two users are always inseparable from design. One is the designer and the other is the user. The designer expresses the user's needs in real-time. The designer and the user in the virtual space belong to the joint design, and the user is the leading one. Virtual reality works are a new platform for artists to create art, and they carry human spirit and aesthetics in the virtual space. Therefore, what people feel in the virtual space is not only the surface they see but also the inner value. As a virtual reality technology exhibition venue, virtual space has no space restrictions. A designer is different from an artist, but an artist can be a designer. In the virtual roaming design, the designer uses the existing software to design and secondary development.

The design itself is not only a form of artistic expression, but also the design has a certain logic, and finally forms a work through some form of splicing and assembly. Because in the earliest design works, practicality was the main idea of design. What everyone paid more attention to was that the Internet increased the distance between people and produced interaction. In the early days of virtual reality technology, it was not artists but scientists who appeared in the early days. As researchers, studying new things can bring people that convenience.

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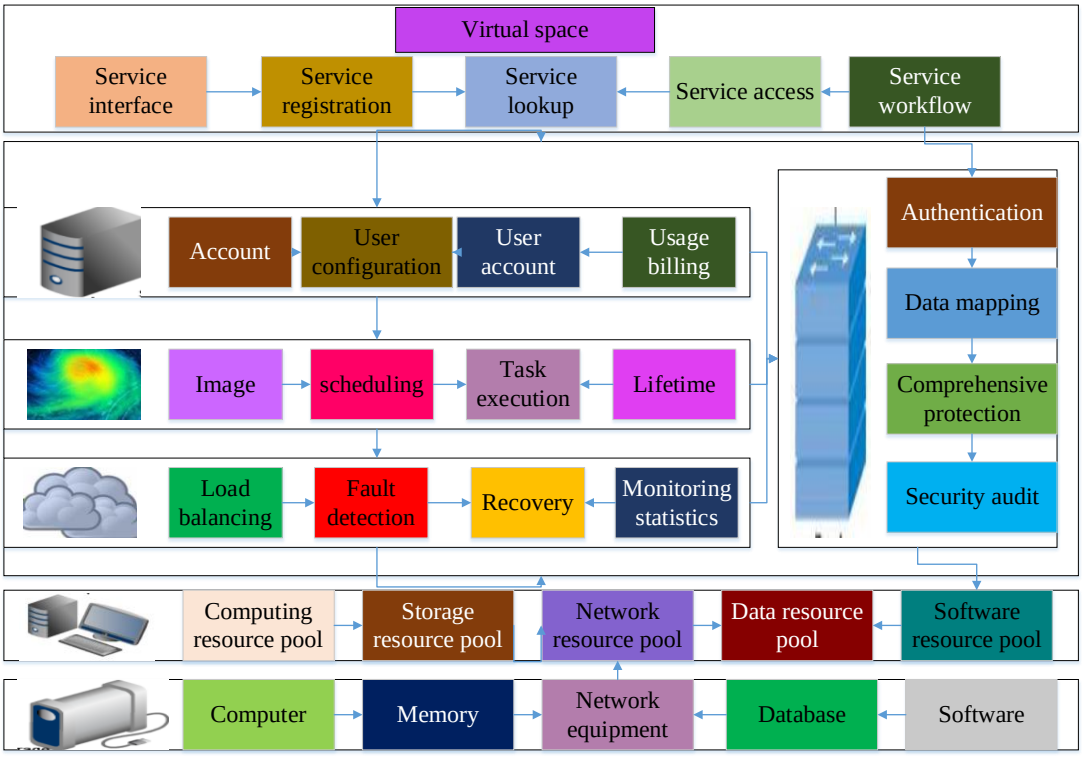


**Fig 4. Digital media art teaching content design framework**

Teachers can make full use of the smart cloud platform to create teaching resources. The smart cloud technology, network, and advanced IoT technology have brought another broader world to our teaching and brought greater development space for students' real and efficient learning. Teachers use the wisdom cloud platform to create teaching resources. The resources of the Internet are massive. Teachers must learn to use resources rationally for students to learn. Teachers need to take the initiative to obtain information, organize information and creatively process information from many information resources, through personal experience or by letting students research cooperatively, to improve students' knowledge construction and cultivate core literacy truly and efficiently. The comprehensive nature of chemistry requires teachers to collect chemistry-related materials as much as possible to make them close to life and students. Students learn independently and think independently. Teaching is not only textbooks, but the virtual environment of smart classrooms creates better conditions for students.

### 3.2 Evaluation index analysis

The interactive nature of the product mainly comes from the basic needs of virtual roaming artwork and user experience. If the product lacks interactivity, it loses its original virtual entertainment characteristics, reduces its value, and at the same time cannot be loved by users. Interactivity is the core of virtual roaming design and an important part of the artwork. The inherent interactivity of virtual roaming art itself has the nature of two-way transmission, which is the communication and feedback between users and products, products and designers, designers, and users. In the virtual roaming environment, the user does everything, through the user's direct or indirect contact with the virtual objects in the scene, the

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feeling and influence produced. In a virtual space full of imagination, users can be immersed in it and reach a state of selflessness. Through the pictures, images, colors, and textures felt by the five senses, the true and false artistic sense brought to users, allowing users and art to merge. In interactive virtual roaming art, users use different methods as signals to initiate interaction, such as touch, space movement, sound, etc., and finally, realize the nature of virtual interaction.

The nature of the interaction displayed by the virtual roaming artwork greatly shows that users need to experience and feel through actions when participating in a virtual environment. When the user directly participates in the virtual work, it becomes a part of the work to be able to truly complete the work. Because virtual roaming is experiential, users are required to participate, feel, and understand. It also requires the designer or artist to use emotion, heart, body, and other factors as references in the production process, and to personally participate in the work produced afterward. Only in this way can users better feel the interactivity, while obtaining a more intelligent and humanized experience value. Users need to personally experience the entertainment brought by virtual reality through the process of participating in artistic activities or artistic creation.

The front-end module transmits the processed video stream to the background, and the background obtains the video stream. Then use the data of 24 frames as a group as the data input to the pose estimation module once and hand it over to the Caffe Server in the background. Then the data of every 24 frames is intercepted as an array for identification. The frame cutting method is not random cutting, but a continuous 24 frame cutting method.

The teacher's central console integrates the control of the student desk's power supply, lifting, dual-channel high-definition camera, cloud terminal, and smart hoisting system. On the software platform, students can view a wealth of experimental teaching materials, complete independent learning, and virtual and real learning. Greatly reduce teachers' classroom time and optimize the quality of teachers' experimental teaching. Teachers can supplement and make teaching resources and upload the resources to the server for students to study and read. It has realized the functions of teaching project production, online task assignment, and online evaluation, and finally, it is convenient for teachers to count the students' learning situation.

In the new media environment, how perception and aesthetic experience are expressed through virtual reality art. It is through a large amount of psychological data about aesthetic feelings, perceptions, emotions, and related works of art to prove the "concretized" cognitive-communication effect brought by virtual art. The interactive art of virtual reality reflects the new art form of new media. In the era of the rapid development of science and technology, the integration of technology and art has formed innovations and displayed more and richer content. Since the information output by virtual reality artworks contains a certain amount of artistic connotation, it is also to better express the interaction between the audience and the art. Virtual reality artworks must enhance their value, to better enhance the experiencer and the interaction and experience of the works realize the communication between each other. Therefore, artistic aesthetics plays a decisive role in the virtual roaming design. For pure artistic aesthetics, beautiful things are revealed through the human heart and happen based on artistic media, just like watching like artworks,

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there is no way to produce aesthetic effects if the viewer does not have the substance that it feels through the senses. In the virtual roaming design, artistic aesthetics refers to the technical dissemination and the feelings brought by the things seen in the virtual space. The virtual space is a kind of artistic medium. In the space, you can freely evaporate your emotions and produce aesthetics. Just as viewers experience the immersion and interactive fun brought by virtual art, from the simplest viewing to the direct inner feeling, the artistic aesthetic value brought by virtual reality art is much higher than that of traditional art forms.

## IV. RESULTS AND ANALYSIS

### 4.1 System performance analysis

Since the parameter measured by the ADXL362 three-axis accelerometer is the value of gravitational acceleration, it can be changed according to the resultant acceleration when the object moves to obtain the degree of interest of the visitors. We collect the acceleration of the object every 0.1 seconds, and the acceleration curve of the object can be obtained by simulation in MATLAB as shown in Fig 5.

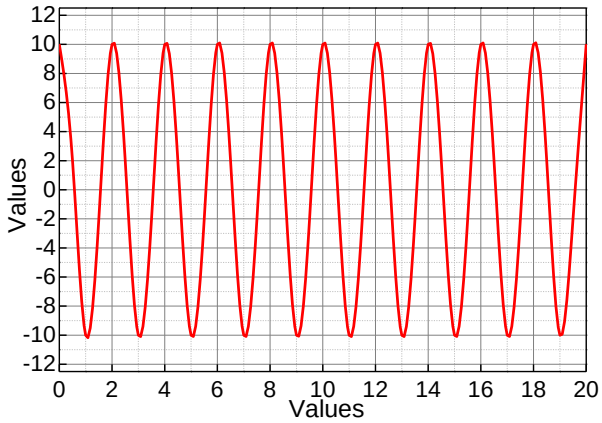


**Fig 5. Simulation diagram of acceleration change**

Since 70% of the data is used as training in the testing phase of the recommendation algorithm, the result verification at this stage will use the remaining 30% of the data to complete the data verification. Top-N recommendation classification usually uses two index parameters to measure, the recall rate and accuracy rate.

First, the value of N needs to be determined, and different values of N are used to test the impact on the accuracy of the algorithm, to sort the entire data set for an initial range. As shown in Fig 6 below, when N takes different values, the improved algorithm is a simulation diagram of the accuracy of the improved algorithm without the number of users.

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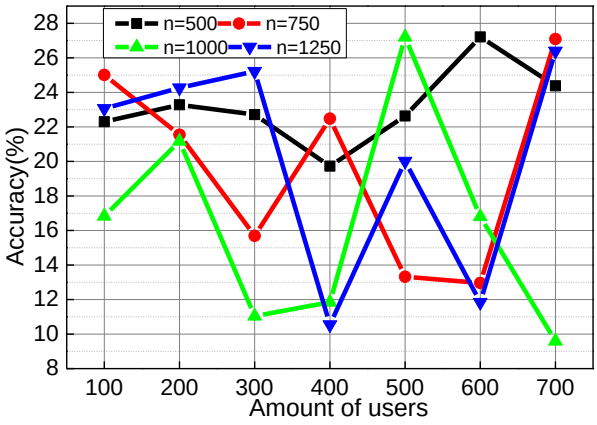


**Fig 6. Simulation diagram of the accuracy of different values of n**

From the above results, it is found that when N takes a relatively small value, as the number of users increases, the increase in accuracy tends to be stable; when the value of N gradually increases, the accuracy also increases, but The volatility and randomness of accuracy will also become larger. Therefore, in comprehensive consideration, when the value of N is 1000, compared with other values, not only the accuracy rate is relatively high, but also as the number of users increases, it is relatively stable. Therefore, the value of N in this article is 1000. When the value of N is determined, according to the definitions of formulas (11) and (12), through simulation in the MATLAB platform, the result is shown in Fig 6. The higher the accuracy and recall values obtained, the higher the accuracy of the algorithm. When the value of N is determined, according to the definitions of formulas (12) and (13), through simulation in the MATLAB platform, the result is shown in Fig 7. The higher the accuracy and recall values obtained, the higher the accuracy of the algorithm.

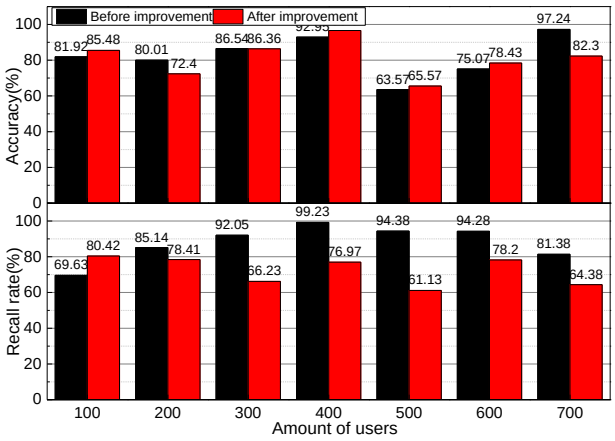


**Fig 7. Simulation results of the algorithm**

It can be observed from Fig 7 that the recommendation result achieved by the improved algorithm after introducing interest as a weight has a significant improvement in the two reference indicators of accuracy and recall. The accuracy rate is increased by about 5%, and the recall rate is increased by about 5%. 3%. The abscissa in the Fig 8 is the number of users, which increases as the number of users in the test increases, and gradually tends to a stable value. To verify the rationality of the two indicators, the above-mentioned reference indicator is based on the Top-N recommendation strategy, that is, 1000

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recommended values to compare with the test set. The scope of the two sets is very wide, and it is just an initial ranking stage.

### 4.2 Teaching results and visual analysis

The construction of space in new media art is undoubtedly one of the most important influencing factors in emotional aesthetics. When we first face art, we must enter the space of art. The relationship between us and space can be said to contain and penetrate each other. In new media art, the interaction and function of the audience and space form a "field", and in this "field", they interweave each other to form a complex and multidimensional relationship. New media art is embodied in different aspects of the creation of emotional space. In terms of physics, the form, size, and position of new media art in the space bear a certain influence on atmosphere and emotion creation; in terms of psychology, the space created by new media art sometimes exceeds the feelings brought by material space.

The statistical analysis of the average scores of the first and second inspections of these 11 classes is shown in Fig 8. It can be found that the average scores of the total scores of each class during the first inspection are different. The highest average score is class A. The average scores of the two experimental classes B and C are at the middle level among the 11 parallel classes; the average scores of the total scores of each class in the second inspection are higher than the results of the first inspection, which can be seen from the score statistics chart. A, B, and C are the classes that have made greater progress compared to the first inspection, especially class A has made the most progress. The implementation of classroom teaching has a certain teaching effect on the average grades of students in parallel classes in junior three.

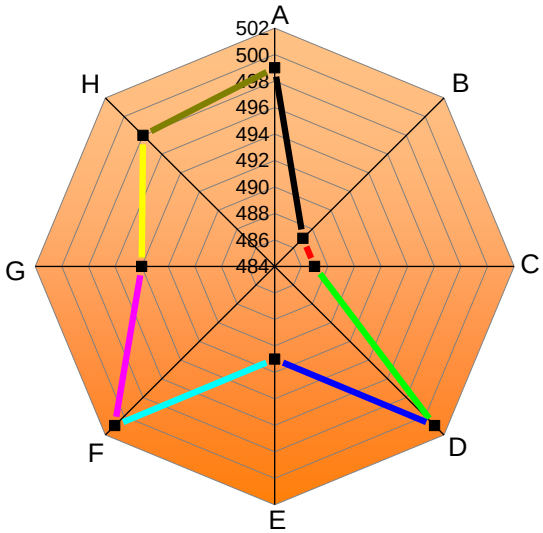


**Fig 8. Results statistics**

To analyze the learning situation of the students participating in this study in the junior high school chemistry smart classroom learning, before and after the implementation of the teaching activity, the students in class A and B were organized to fill in the "questionnaire for the teaching situation of junior high school chemistry smart classroom", use SPSS to statistically analyze the results of the survey, and

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according to the analysis results, find the problems in this research and test the effect of teaching implementation. The questionnaire has a five-level scale, and students fill in it according to their actual conditions. Before implementation, 95 questionnaires were issued, 90 valid questionnaires were returned, 95 questionnaires were sent after the test, and 90 valid questionnaires were returned.

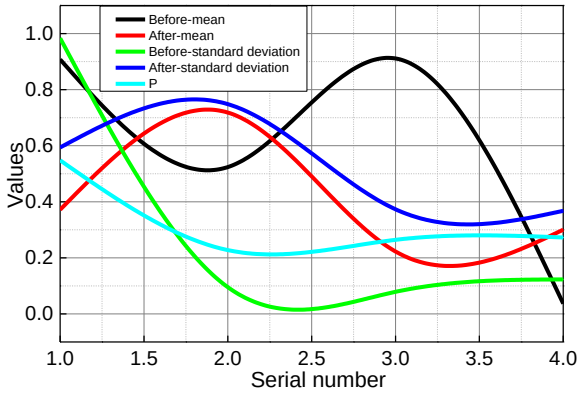


**Fig 9. Survey results of pre-class preview**

The data in Fig 9 shows that the P-value of questions 2, 3, and 4, indicating that there are significant differences in the results of the survey before and after the implementation of the teaching. After the implementation of teaching, students' understanding of the pre-class preview has changed greatly. However, the average value of students' pre-class preview is low. The average value of pre-class preview is less than 3.00, and the average value of pre-class preview is below 3.00, and the P-value of question 1>0.05. There is no significant difference in the pre-learning initiative before and after, and the standard deviation that is considered necessary for the pre-learning is >1.000, indicating that the students' ideological initiative is quite different. Most students have poor active learning ability and are unconscious in learning. It is not necessary, and some students think it is necessary. However, the average value of the second question is 3.12 and the standard deviation is 0.854. The third question is that the preview is helpful for learning, the average value is 3.01, and the standard deviation is 0.620, indicating that students know that the preview is helpful for learning, and do not think the content of the preview is large, but they don't have to take action, and they also recognize that the preview is helpful for learning, that is, poor execution and unsynchronized thinking and behavior, indicating that the study is not hard enough. Compared with the data before the implementation of the teaching activities, the average value of each question has been improved, except for the P-value of question 1>0.05, the P-value of questions 2, 3, and 4 is <0.05, and the standard deviation is also less than 1.000, It shows that the students' learning attitude towards pre-class preparation is developing in a good direction, the differences among students are also reduced, and the overall understanding of pre-class preparation has been improved.

To help students understand how to correctly understand the intentions and emotions expressed by artists in artworks, and to appreciate the deep meaning of artworks. In image artworks, what the artist expresses is not only the "image" in the objective world, but the "image" in the artist's "intention", so it is called "image". In classroom teaching activities, students experience artworks with a two-dimensional image carrier, and it is easy to focus on the picture of the artwork, thus ignoring the subjective feelings

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brought by the artwork. When using virtual reality technology to appreciate imagery artworks, students can be brought into the picture, feel the same virtual picture as the artwork, and feel the subjective intention of the artist in the painting, as shown in Fig 10. After studying in this lesson, students will learn to use critical thinking to recognize and understand the diversity of artistic works, help perceive image art in a three-dimensional virtual space, explore the essence, characteristics, and cultural connotation of art, and improve aesthetic quality.

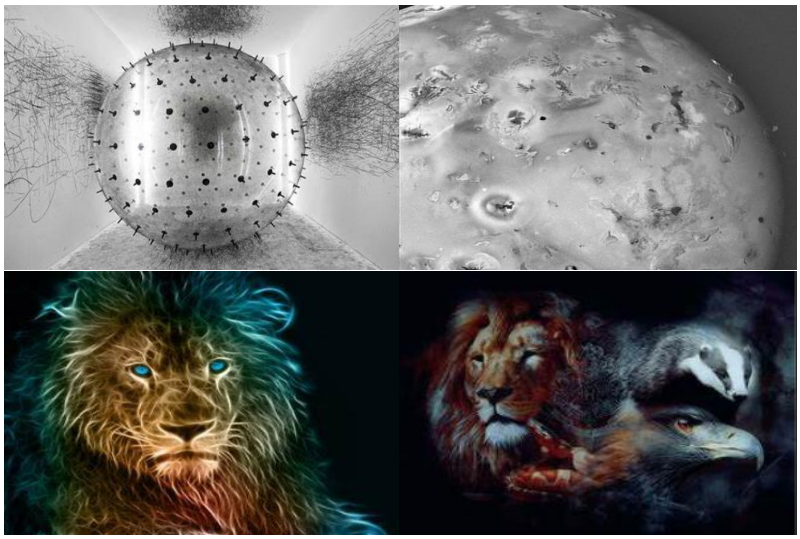

**Fig 10. Schematic diagram of visualization results**

Personal experience and practice can stimulate students' interest in learning more than simple viewing, and it is easier to understand the spiritual and cultural connotations of artworks in the process of experience and practice. In teaching activities, virtual art appreciation provides students with more experience, presence, and immersive teaching content. Students can touch, enlarge, rotate, or even split and change artworks in virtual space, which provides a great opportunity for art appreciation. The new method allows students to carry out appreciation activities from different perspectives and provides a broader space for teachers' education and teaching. In the classroom teaching process, adhere to the "student-oriented" theme and actively play the role of students as the main body. Teachers mainly help students to complete art appreciation through guidance; attach importance to students' appreciation and experience in virtual appreciation, and combine the structure of the situation and context. To help students better understand and understand artworks; to conduct experiential learning, to guide students to discover and solve problems independently in virtual appreciation, to enhance students' self-study inquiry ability; organize students to carry out group cooperation, discussion, report, competition and other forms to learn, let students communicate more, think more, practice more, and apply what they have learned.

## V. CONCLUSION

Based on the in-depth research and discussion of digital media art teaching assisted by artificial intelligence and virtual reality computing, this paper designs a digital media art teaching system assisted by artificial intelligence and virtual reality computing, and uses it for teaching, displaying the results through visualization, the result is concrete. Virtual reality technology has opened a new field for art

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appreciation teaching. Unlike traditional art teaching, applying virtual reality technology to classroom teaching requires teachers to have a sufficient understanding of the characteristics and functions of virtual reality technology and reasonably control teaching design and teaching activity. For the knowledge and content of artworks that need to be enhanced by virtual reality technology, teachers need to have in-depth understanding and control, so that the teaching of virtual reality technology can be used. Reasonably use immersive, experiential, and situational teaching modes, and make targeted adjustments to teaching goals, teaching concepts, teaching design, and course practice. The new art form of expression formed by traditional art under the new media is a virtual roaming design. The development of art in the new era cannot be separated from the development of technology. Tracing back to the development process of virtual roaming technology, from the initial bold attempt of simulation technology to the budding period of virtual roaming design, after that, through people's bold imagination and thinking changes, with the continuous improvement of technology, virtual roaming design entered the industry since then, new technologies have been developed and become a branch of virtual roaming technology, and virtual roaming technology has been vigorously developed and applied in various fields.

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