

# Online Art Design Education System Based On 3D Virtual Simulation Technology

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## Abstract

In order to improve the performance of online art design education system, based on 3D virtual simulation technology, this paper constructs an online art design education system based on 3D virtual simulation technology. Moreover, according to the online art design requirements, this paper proposes an SVR-SA model combining support vector machine regression analysis and simulated annealing algorithm. The new algorithm has high prediction accuracy, small error, and meets engineering design requirements. In addition, according to the characteristics of art design, this paper efficiently connects virtual reality technology with art design process, designs online art education functional modules, and conducts system performance verification. Finally, this paper designs an experiment to evaluate the teaching experience of an online art design education system based on 3D virtual simulation technology, and analyzes the experimental results with mathematical statistics. The research results show that the system model constructed in this paper meets the current online art education needs, and the functional modules can be continuously optimized in the future.

**Keywords:** Virtual simulation, Online art, Education, Machine learning

## 1 Introduction

The construction of the education information system is still basically at the stage of development and purchase of the education information system platform. Some schools simply put the teaching plans, multimedia courseware, teaching videos, etc. used for regular classroom teaching on the Internet. In addition, some of them put these content on the Internet purely for the purpose of applying for quality courses. Therefore, the education information system of the art subject has too much focus on the surface layer of equipment update, network courseware, and multimedia display. It just puts the traditional teaching concept on the coat of network, and does not reflect the interactive monitoring, evaluation and feedback in the

teaching process that the education information system should have. Moreover, the curriculum does not start from the essence of the teaching mode of the education information system, the overall quality is not high, the imitation phenomenon is serious, and it lacks interactive design and lacks evaluation and feedback [1].

From the perspective of my country's educational methods and methods, online education makes full use of the resource advantages of online education to provide learners with an environment for autonomous learning. This form of education takes learning theory and modern education as the guiding ideology, enriching the teaching model Diverse. In today's society, the competition is increasingly fierce, and the demand for innovative technical talents is even more obvious. Course teaching based on the Blackboard network teaching platform conforms to the trend of teaching method reform, and the development of the network provides good and stable technical support for the implementation of course teaching. Teachers use the Blackboard platform to realize online and offline teaching. This kind of teaching mode that breaks through the limitations of time and space facilitates the consolidation and assimilation of knowledge by students, increases the emotional communication between teachers and students, and mobilizes students' enthusiasm for independent learning. Moreover, it enriches students' after-school life, expands students' knowledge horizons, and greatly improves students' artistic literacy and creative skills [2].

With the further development of virtual reality technology, the application of 3D virtual simulation technology to the online art design education system can effectively improve the teaching effect [3]. The aim of this study is to see how distance learning, which is delivered abruptly, affects students' expectations of art lessons. Learners who undertake art classes via online learning are obliged to take art classes via online learning, and therefore may not have any technological challenges coupled with the availability of devices. However, they lose motivation, may not satisfy their socialization requirements, and particularly certain strategies which require practice in study sessions. In

view of this, based on 3D virtual simulation technology, this paper constructs an online art design education system based on 3D virtual simulation technology.

## 2 Related Work

Virtual reality technology originated in the United States. It is a technology that aims to build a system-integrated virtual environment and expresses the real world by controlling virtual objects in the virtual environment [4]. The three most notable characteristics of virtual reality technology are immersion, interactivity and imagination [5]. Simulation operations have begun to be widely used in industries and manufacturing industries. With the difficulty of traditional on-site training, the students' operational ability cannot be practiced, and the high-risk accidents caused by mis-operation cannot be reproduced, people begin to pay more attention to the application research of the operation simulation training system. In foreign countries, virtual simulation training technology is widely used in complex and high-risk industrial fields [6]. The literature [7] combined virtual reality technology with related knowledge of CNC machine tools to develop a set of NC basic simulation system, and designed the functional training of the operator for the installation, operation, maintenance and other aspects of the injection molding machine. The literature [8] used virtual simulation technology to predict the exposure level of nuclear power plant radiation work, and visually predicted the exposure rate of workers in high-risk areas, which greatly reduces the nuclear radiation risk of personnel to some extent. The literature [9] carried out virtual simulation design and optimization of nuclear fusion device. The electromagnetic analysis and thermal analysis of ITER feedback system showed the application of virtual simulation in nuclear fusion engineering and the importance of simulation technology. Aiming at the problem of gas leakage and diffusion in industrial parks, the literature [10] used virtual simulation technology to simulate. This research shows that virtual simulation technology can effectively simulate the 3D scene when an accident occurs, and can be applied to emergency drills and accident analysis. The literature [11] used virtual reality technology to combine physical simulation and software simulation to realize virtual reality simulation training of substations, and optimize the system in 3D Max, solve the unstable situation of animation pictures, and strengthen the operation of operators on the substation system. The literature [12] applied virtual simulation technology to the wind power system training industry, and established wind power simulation based on actual wind farms. This system has been successfully applied in improving the daily operation and maintenance capabilities of wind power staff on wind power equipment. The literature [13] established a virtual

reality simulation system for missile tracking attack, and used Vega Prime as a system development tool to simulate the attack process of a certain type of missile flight tracking, and obtained ideal simulation results. The literature [14] gave a detailed introduction to virtual reality-oriented real-time graphics generation technology and its development. Among them, it mainly studies the hardware architecture of graphics generation and various effective technologies for acceleration in the generation of realistic graphics in virtual reality. The literature [15] used virtual reality technology in live-work teaching and training, and developed an immersive live-work simulation training system based on live-work simulation practice technology. The literature [16] used a composite multi-user interaction structure and used Uni-ty 3D and Visual Studio 2010 to develop a mechanical cleaning operation training system in the oilfield storage and transportation process. The computer operation simulation system of domestic large-scale air separation plant designed by the literature [17] realizes the operation simulation design of the normal operating state of the large-scale air separation plant and the start-up process of the large-scale air separation plant. With the complete operation screen, it realizes the same operation process as on-site. The literature [18] used Flash technology and Unity 3D technology to develop and design a virtual simulation training system in the rocket test launch process, which more realistically reproduces the rocket test launch process. The literature [19] used the somatosensory interactive peripheral Kinect as the input device of the system to design and develop an immersive fire training system based on the Unity 3D engine. The literature [20] used dynamic cinema equipment as an experience device to simulate the consequences of an accident to study the communication mechanism between the equipment and the virtual reality platform, develop a message-driven interface, and build an immersive virtual reality safety training system. The literature [21] studied the basic theory and technology of virtual simulation, used 3D Max software to build models, combined with the virtual simulation system development engine Converse 3D, developed a mine face VR production simulation system. The literature [22] studied the methods and technologies involved in emergency drill simulation in a distributed online environment, and designed and developed a plan training and evaluation system. The literature [23] used the concrete realization model of TC6020 tower crane to design and developed a three-dimensional immersion virtual simulation system for tower crane.

## 3 Support Vector Machine Theory

SVM stands for Support Vector Machine as well as being a supervised learning algorithm consisting of grouping, correlation, and even feature extraction.

Trying to draw a direct boundary between two groups is how the static SVM classifier functions. SVMs are particularly useful because we have no prior knowledge of the data, and they function well for both unstructured and semi - structured data, such as text, objects, and structures. The kernel trick is SVM's real power, and it can solve any complicated subject. It manages high dimensional data fairly effectively. In reality, SVM models provide generalisation, and the chance of over-fitting was much less and often as opposed to ANN models. SVMs outperform ANN prototypes in terms of accuracy.

(1) Conversion of inequality constraints to equality constraints

The regression problem in two-dimensional space is that when the sample points are given, a regression line is found so that all sample points are on the regression line as much as possible. The red line in the Figure 1 is the required regression line.

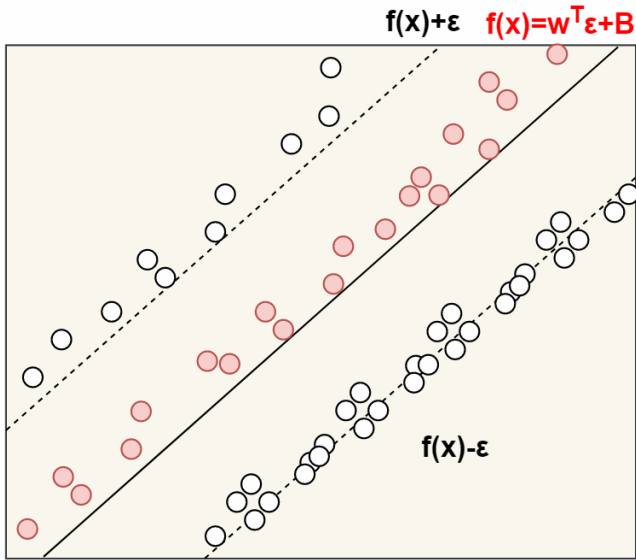


Figure 1. Regression line graph

After extending to n-dimensional space, the distance from point  $x = (x_1, x_2, \dots, x_n)$  to line  $w^T x + b = 0$  is:

$$\frac{|w^T x + b|}{\|w\|} \tag{1}$$

Among them,

$$\|w\| = \sqrt{w_1^2 + \dots + w_n^2} \tag{2}$$

In the n-dimensional space, the purpose of SVR is to find the minimum interval “hyperplane” so that all data points are closest to the “hyperplane”. The mathematical description of SVR for finding the best-fitting plane is:

$$\min_{w,b} \frac{1}{2} \|w\|^2 + C \sum_{i=1}^m l_\epsilon (f(x_i) - y_i) \tag{3}$$

Among them, C is the regularization constant and  $l_\epsilon$

is:

$$l_\epsilon(z) = \begin{cases} 0 & \text{if } |z| < \epsilon \\ |z| - \epsilon & \text{otherwise} \end{cases} \tag{4}$$

The traditional regression model calculation method of loss is to compare the predicted output value with the true value, and the loss is 0 when the two must be exactly the same. The loss calculation idea of the support vector regression algorithm is to introduce an allowable error  $\epsilon$ , and the difference between the predicted output value and the allowable error is compared with the true value to calculate the error, thus enhancing the robustness of the algorithm.

$$\min_{w,b,\xi_i,\hat{\xi}_i} \frac{1}{2} \|w\|^2 + C \sum_{i=1}^m (\xi_i + \hat{\xi}_i) \tag{5}$$

$$s.t. f(x_i) - y_i \leq \epsilon + \xi_i \tag{6}$$

$$y_i - f(x_i) \leq \epsilon + \hat{\xi}_i \tag{7}$$

$$\xi_i \geq 0, \hat{\xi}_i \geq 0, i = 1, 2, \dots, m$$

Lagrange multipliers are introduced:

$$\mu_i \geq 0, \hat{\mu}_i \geq 0, \alpha_i \geq 0, \hat{\alpha}_i \geq 0 \tag{8}$$

The Lagrangian function is obtained, and the SVR dual problem is obtained by dual conversion.

$$\max_{\alpha,\hat{\alpha}} \sum_{i=1}^m y_i (\hat{\alpha}_i - \alpha_i) - \epsilon (\hat{\alpha}_i + \alpha_i) \tag{9}$$

$$- \frac{1}{2} \sum_{i=1}^m \sum_{j=1}^m m (\hat{\alpha}_i - \alpha_i) (\hat{\alpha}_j - \alpha_j) x_i^T x_j$$

$$s.t. \sum_{i=1}^m (\hat{\alpha}_i - \alpha_i) = 0 \tag{10}$$

$$0 \leq \hat{\alpha}_i, \alpha_i \leq C$$

The above process meets KKT conditions:

$$\alpha_i (f(x_i) - y_i - \epsilon - \xi_i) = 0 \tag{11}$$

$$\hat{\alpha}_i (y_i - f(x_i) - \epsilon - \hat{\xi}_i) = 0 \tag{12}$$

$$\alpha_i \hat{\alpha}_i = 0, \xi_i \hat{\xi}_i = 0 \tag{13}$$

$$(C - \alpha_i) \xi_i = 0, (C - \hat{\alpha}_i) \hat{\xi}_i = 0 \tag{14}$$

It can be seen that only when  $f(x_i) - y_i - \epsilon - \xi_i = 0$ ,  $\alpha_i$  can take a non-zero value, and only when  $y_i - f(x_i) - \epsilon - \hat{\xi}_i = 0$ ,  $\hat{\alpha}_i$  can take a non-zero value. In other words, only when the sample does not fall into the interval between  $\epsilon$ , the corresponding  $\alpha_i$  and  $\hat{\alpha}_i$  can take non-zero values. In addition, the following

constraint  $f(x_i) - y_i - \varepsilon - \xi_i = 0$  is executed. (2)

Converting nonlinear problems to linear problems

There are two types of classification problems: linear separable and linear inseparable. The fitting is also divided into linear fitting and nonlinear fitting. The problems discussed in the previous section are all linearly fitting or most linearly fitting cases. When solving nonlinear problems, the theoretical idea of support vector machines is to transform low-dimensional space problems into high-dimensional space problems, which are displayed as non-linear problems in low-dimensional space, and there is always a high-dimensional space that can be linearized. For example, two types of points in a two-dimensional space can fit the sample through a straight line. When it is not easy to perform linear division in two-dimensional space, it can find a plane in three-dimensional space and fit it linearly. Even if there is no optimal plane in the three-dimensional space, there must be a "hyperplane" in the higher-dimensional space that can achieve linear fitting of samples. At this point, we have such a function:

$$k(x, y) = (\phi(x), \phi(y)) \tag{15}$$

The inner product of  $x_i$  and  $x_j$  in the mapping space is equal to the result calculated by the function  $k(x, y)$  in the original space. Such functions are called kernel functions. In the kernel function, how y operates on x, and after mapping, each y operates on x accordingly. After the kernel function is introduced, the nonlinear problem can be converted into a linear problem. Moreover, it only needs to perform calculations in the original sample space, so it avoids a large number of calculations in high-dimensional spaces, reduces the amount of calculations, and also reduces the memory space used for calculations. The commonly used kernel functions are as follows:

The linear kernel function (Liner Kernel) is:

$$k(x_i, x_j) = x_i^T x_j \tag{16}$$

The polynomial kernel function is:

$$k(x_i, x_j) = (x_i^T x_j)^d \tag{17}$$

The radial basis kernel function (RBF) is:

$$k(x_i, x_j) = \exp\left(-\frac{\|x_i - x_j\|^2}{2\delta^2}\right) \tag{18}$$

Sigmoid kernel, string kernel, Fourier kernel and spline kernel.

The simulated annealing algorithm regards the best solution to the problem as the state in which the solid reaches the lowest temperature, lowest energy, and most stable molecule and atom during the annealing

process. The key of the simulated annealing algorithm is to introduce a random disturbance mechanism in the local search process. The simulated annealing algorithm is an effective technique that simulates the selective precipitation of materials, which is distinguished by a gradual decrease in atomic motions which through the concentration of intrinsic defects it until lowest energy phase is achieved. Real Annealing is the basis for the Penalty Function algorithm. Functional annealing seems to be the process of burning a substance to a temperature range but instead slowly cooling it to meet the optimum framework

The optimization process of the simulated annealing algorithm is shown in Figure 2:

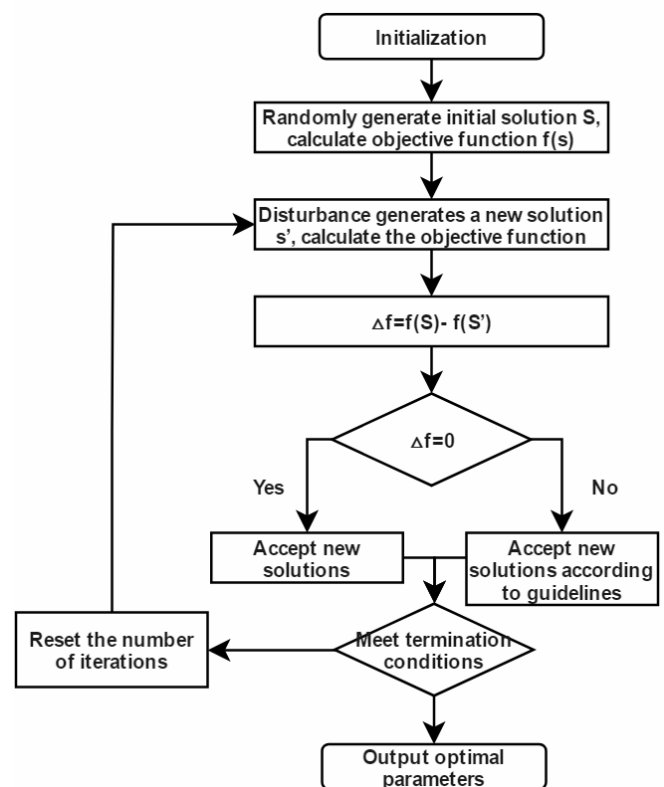


Figure 2. Optimization process of simulated annealing algorithm

The simulated annealing algorithm has simple calculation process, flexible application, parallel processing, strong robustness and good performance. Therefore, combining support vector machine theory with simulated annealing algorithm can be used to solve complex nonlinear optimization problems.

### 4 SVR-SA Model Establishment

The SVM toolbox in the MATLAB software can only perform primitive two-classification operations, and cannot perform more complex multi-classification operations and fitting problems. The libsvm installation package can perform multi-category label classification and fitting regression analysis. The installation package is available in Python, C, Java, MATLAB and other

languages. This design uses MATLAB 2016a software platform combined with libsvm toolbox to realize the SVR-SA model data training and prediction functions. Whatever business entities may appear in the repository is determined by the source database schema. The aim of the specified database schema is to demonstrate how well the archive’s hierarchical tables represent the marketing strategies extracted again from database. Similar update strategies can result with the

use of various variants or renders of the very same data source, although the data sets would be the same. Besides that, there may be many ways to connect different physical objects that are linked. It works by applying specifically established sweeping rules to various data sources with significantly distinct information models and conceptual frameworks.

In the process of model building, the parameters that need to be determined and solved are shown in Table 1:

**Table 1.** SVR-SA model parameters and values

Parameter name	Parameter value
Punishment factor C	0-1000
Kernel function parameter g	0-100
Allowable error ε	0-01
Markov chain length	100
Attenuation parameter	0.99
Metropolis step factor	0.2
The initial temperature	100
Final temperature	3
Boltzmann constant	1

The modeling process is as follows:

Step 1: The input and output variables of the SVR-SA model are selected;

Step 2: The processing data is loaded, and the data is initially processed.

After that, we normalize all data to reduce the magnitude of the impact on prediction accuracy. The principle of normalization is shown in the following formula:

$$f : x \rightarrow y = \frac{x - x_{\min}}{x_{\max} - x_{\min}} + 1 \tag{19}$$

Step 3: The target fitness function is established and the constraints are established.

$$\begin{cases} \min f(C, g, \varepsilon) = \frac{1}{n} \sum_{j=1}^n (y_j - \bar{y}_j)^2 \\ s.t., C \in [C_{\min}, C_{\max}], g \in [g_{\min}, g_{\max}], \varepsilon \in [\varepsilon_{\min}, \varepsilon_{\max}] \end{cases} \tag{20}$$

In this formula,  $y_j$  represents the j-th sample data, and  $\bar{y}_j$  represents the j-th sample data obtained by simulation calculation.

Step 4: SA initial temperature T and initial solution state S are set, and the number of iterations L expressed by different initial temperature T values is different;

Step 5:  $k = 1, 2, \dots$  is substituted into the objective function  $f(x)$  to generate a new solution  $S'$ ;

Step 6: The increment is calculated;

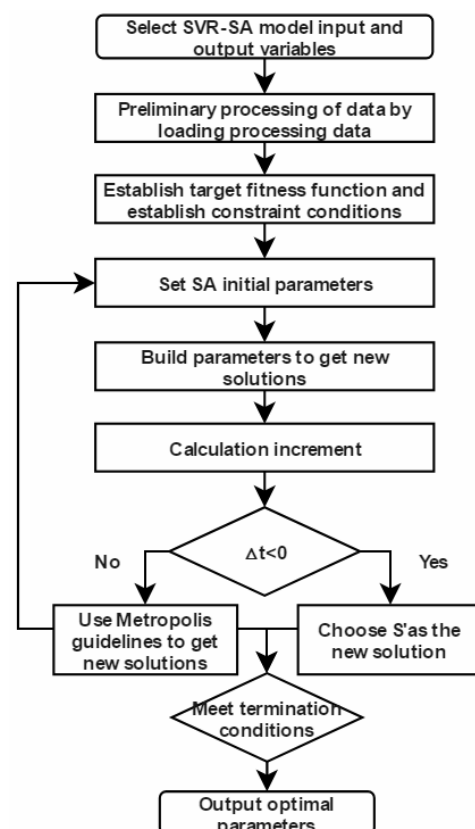
$$\Delta T = f(S') - f(s) \tag{21}$$

Step 7: If  $\Delta T < 0$ , then we choose  $S'$  as the new solution. If  $\Delta T \geq 0$ , then we need to use Metropolis criteria to determine whether  $S'$  can be a new solution

according to the calculation method of  $\exp(-\Delta T/T)$ ;

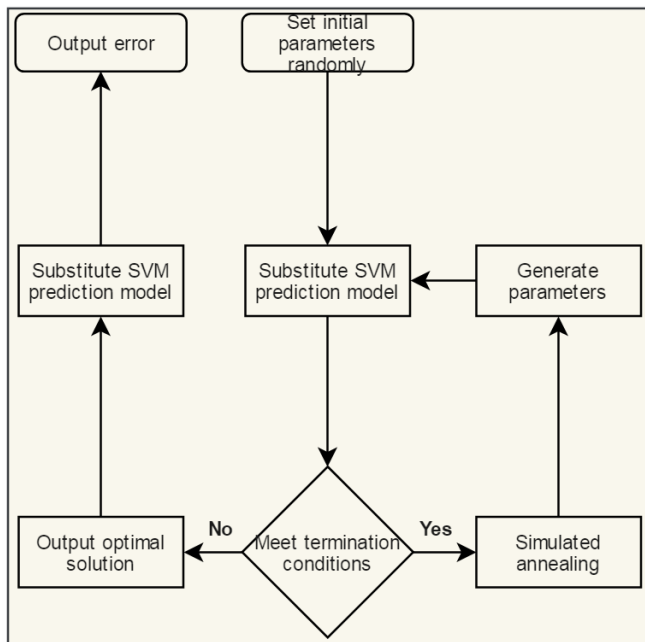
Step 8: If the end temperature is reached, the current solution is the optimal solution, the algorithm outputs this solution, and the operation ends;

Step 9: If the termination condition is not reached, T is reduced according to a certain attenuation function, and the algorithm repeats steps (4) to (7). The flow chart of establishing the SVR-SA model is shown in Figure 3 below:



**Figure 3.** Flow chart of SVR-SA model establishment

The operation flowchart of SVR-SA prediction model is shown in Figure 4:



**Figure 4.** The operation process of the prediction model

After 70 sets of data training, the SVR-SA model obtains the penalty factor C and the kernel function parameter g. The results are shown in Table 2.

**Table 2.** SVR-SA parameter values

Parameter	Optimized parameter values
Punishment factor C	254.3
Kernel function parameter g	81.44

Using optimized parameter values, 21 sets of data are predicted, and absolute relative error (ARD) and average relative absolute deviation (AARD) parameters are used to evaluate the prediction accuracy of the model.

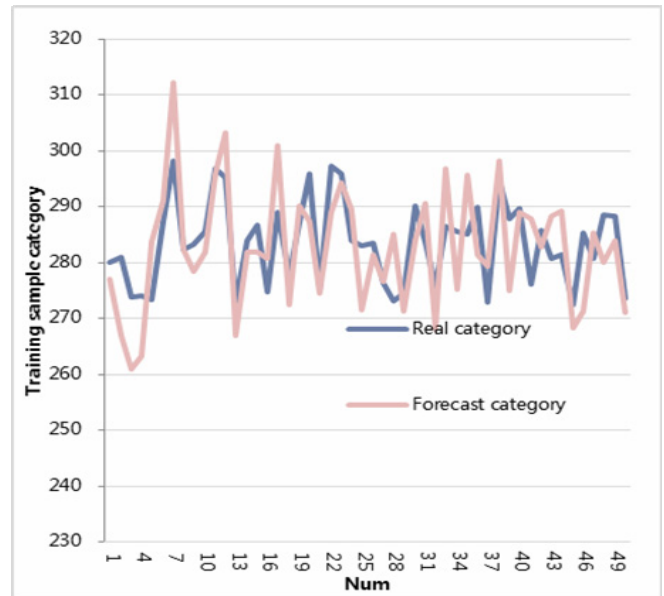
The functions of ARD and AARD are defined as follows:

$$ARD = \left| \frac{y_i^{exp} - y_i^{pre}}{y_i^{exp}} \right| \times 100\% \tag{22}$$

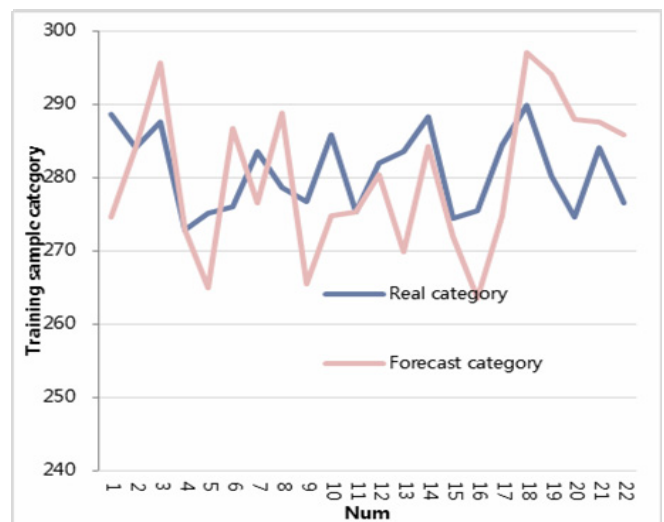
$$AARD = \frac{1}{n} \sum_{i=1}^n \left| \frac{y_i^{exp} - y_i^{pre}}{y_i^{exp}} \right| \times 100\% \tag{23}$$

In the formula,  $y_i^{exp}$  represents the value obtained through the experiment of the i-th data point,  $y_i^{pre}$  represents the predicted value calculated by the SVM model of the i-th data point, and the total number of data points is n.

The SVR-SA model training and prediction results are shown in Figure 5 and Figure 6, which define the prediction accuracy rate of the model.



**Figure 5.** Training set results



**Figure 6.** Test set results

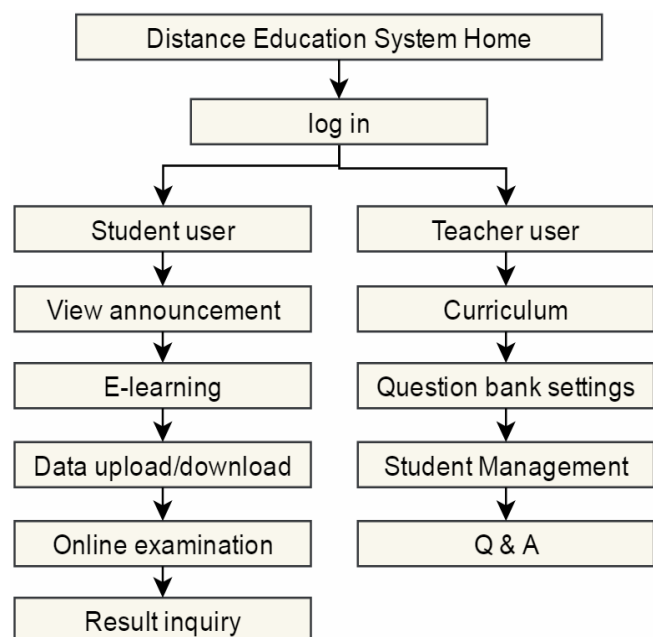
It can be seen from Figure 5 and Figure 6 that the prediction results of the training set are better, the maximum ARD is 3.739%, and the AARD is 0.31306%. The test set has a larger error relative to the training set, but the error is within an acceptable range compared to the traditional model. The ARD is 1.9452%, the AARD is 0.45614%, and the average absolute error (MAE) is 0.3553%.

### 5 Construction and Performance Evaluation of Online art Design Education System Based on 3D Virtual Simulation Technology

The distance art design education system is a new structure model that is actively introduced in the current education reform. It effectively adjusts and operates various networked resources, and has greatly

reformed the development of education structure in the new era. The remote art design system is basically composed of multiple modules or subsystems with different functions, which is also in line with its multi-functional structure. Although different modules or subsystems are not significant enough for the function of distance education, as long as each structure cooperates with each other, the ideal teaching effect can be achieved. What needs attention is that when creating a good environment for the system, we must collect all kinds of information and materials to meet different artistic knowledge exchange tools and enhance students' enthusiasm for independent learning.

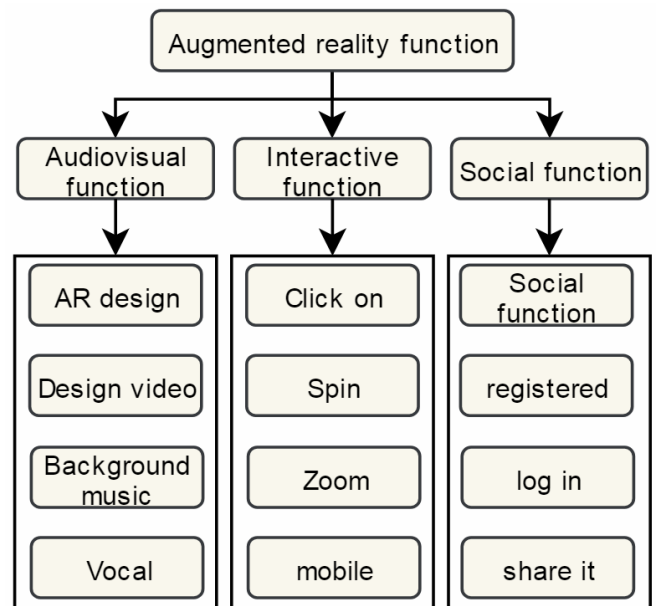
Figure 7 shows the functional framework of an online art design education system based on 3D virtual simulation technology. Safety education is critical for fostering a secure and healthy working atmosphere in the construction sector; furthermore, existing pedagogical methodologies at the higher level are insufficient to provide students with authentic protective interactions. The concept that enables learners to connect in exemplary role, interactive and dialogue learning, and human interaction in a 3D virtualized world, was tested to assess the pros and cons of the cooperative VR platform safety management curriculum. Each stage of the evaluation process includes performance assessments, while testing process is being used to provide instructor input such that requirements and solutions evolve to strengthen or improve the program. The system takes augmented reality as its core, including audiovisual, interactive, and social functions.



**Figure 7.** The structure diagram of the distance art design education system

On the basis of building the above model (Figure 8), the model performance is verified. In this test, the experimental data adopts the calculation and

measurement methods of average and variance values. Among them, the average value, also known as the sample mean, represents the number of central trends in a set of data. The technical method is to divide the sum of all data in a set of data by the number of this set of data. Variance is the average of the squared value of the difference between each sample value and the average of the entire sample value, and it is a measure of the degree of dispersion of a random variable or a set of data. By performing statistics on the data of the user experience test questionnaire for augmented reality shadow play completed by the user, a statistical table of user experience test scores as shown in Table 3 and a statistical table of user experience data under various indicators as shown in Table 4 and Table 5 are obtained.



**Figure 8.** Online art design education system based on 3D virtual simulation technology

The user experience index data is drawn as a statistical graph, as shown in Figure 9 and Figure 10 respectively.

Through the above analysis, we can see that although the online art design education system based on 3D virtual simulation technology constructed in this paper has not reached the excellent level in terms of satisfaction, it has exceeded the traditional teaching mode.

## 6 Conclusion

Under the new situation, it is necessary to re-examine and evaluate the traditional art and design education model based on the current development of my country's higher art design education, and conduct scientific research on the modern distance art design education that has just started, so as to construct a scientific and reasonable higher art Design the



**Table 3.** Statistical table of test scores of user experience

NO.	Study-time	Operation method	Degree of difficulty	give an order	Get feedback
1	4.95	4.85	4.75	4.85	4.44
2	5.05	4.85	4.85	4.95	4.65
3	4.85	5.05	4.75	4.75	4.55
4	4.95	4.75	4.95	4.55	4.75
5	5.05	4.85	5.05	4.65	4.34
6	4.95	4.95	4.65	4.65	4.75
7	4.95	4.85	4.85	4.55	4.44
8	4.85	4.95	4.65	4.75	4.55
9	5.05	5.05	5.05	4.95	4.65
10	4.75	4.75	4.95	4.85	4.34
11	4.95	4.95	5.05	4.65	4.75
12	5.05	5.05	4.75	4.85	4.34
13	4.95	4.65	4.85	4.75	4.55
14	4.85	4.85	4.95	4.95	4.65
15	4.95	4.65	4.95	4.55	4.44
16	4.85	5.05	4.85	4.65	4.85
17	4.95	4.95	4.75	4.85	4.65
18	4.75	4.75	5.05	4.75	4.55
19	5.05	4.85	4.85	4.55	4.24
20	5.05	4.75	4.85	4.95	4.44

NO.	Prompt	interface design	Music sound effects	Fun function
1	4.44	5.05	4.34	3.94
2	4.04	5.05	4.95	4.75
3	4.24	4.75	4.65	4.34
4	4.14	4.95	4.44	4.14
5	4.34	4.85	4.85	4.55
6	4.14	4.95	4.24	4.44
7	4.34	4.85	5.05	4.24
8	4.24	4.95	4.65	4.34
9	4.04	5.05	4.34	4.65
10	4.44	4.95	4.95	4.04
11	4.44	4.75	4.85	4.55
12	4.14	5.05	4.44	4.14
13	4.24	4.85	4.65	4.34
14	4.04	4.95	4.55	4.24
15	4.34	4.95	4.75	4.44
16	4.44	5.05	5.05	4.04
17	4.55	4.95	4.85	4.65
18	4.24	4.85	4.65	4.34
19	4.04	4.95	4.24	4.44
20	3.94	5.05	4.44	4.24

**Table 4.** Statistical table of user experience index data (1)

	average value	Variance value
Study-time	4.949	0.0094637
Operation method	4.848	0.0165842
Degree of difficulty	4.848	0.0165842
give an order	4.747	0.0212605
Get feedback	4.545	0.02525
Prompt	4.242	0.0297647
interface design	4.949	0.0094637
Music sound effects	4.646	0.0669832
Fun function	4.343	0.0478437

**Table 5.** Statistical table of user experience index data (2)

	Ease of use	Interactivity	Satisfaction
average value	14.5	13.4	13.8
Variance value	0.04221	0.07552	0.12306



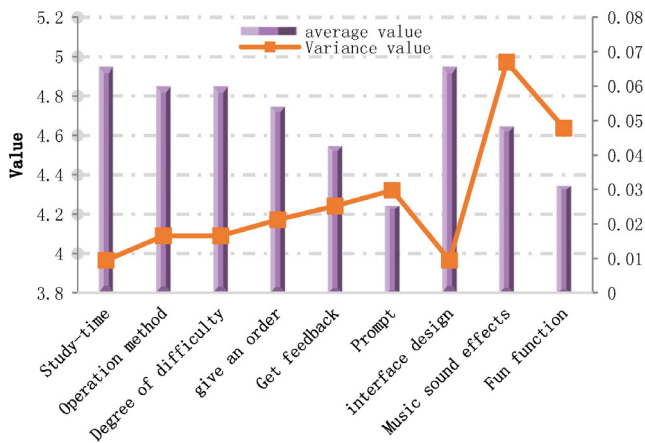


Figure 9. Statistical diagram of user experience index data (1)

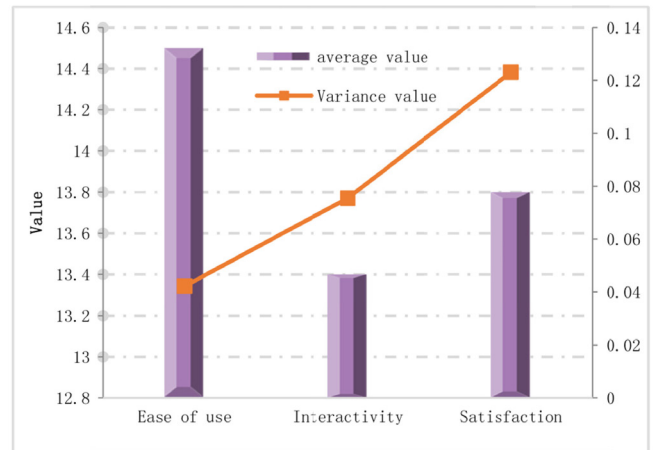


Figure 10. Statistical diagram of user experience index data (2)

education system. This article combines 3D virtual simulation technology to build an online art design education system, combines SVM to apply virtual reality technology to teaching, and combines online art design education requirements for functional module settings. Finally, this paper evaluates the teaching effect of the online art design education system based on 3D virtual simulation technology through teaching experience teaching. The evaluation results prove that the system constructed in this paper is effective.

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## Biography



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