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Research Article

Creation of Drama Art Based on Deep Learning and Evolution Strategy

Xin Tang

Drama Arts School, Shenyang Normal University, Shenyang, Liaoning 110034, China

Correspondence should be addressed to Xin Tang; tys1006@synu.edu.cn

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The rapid development of information technology has promoted the growth of deep learning, artificial intelligence, and big data technology. Nowadays, the artistic form of traditional opera creation is accepted and respected by people—more and more people like the art form. However, the artistic creation of traditional opera needs inspiration. The essence of inspiration creation is to reconstruct its objective structure. The deep learning algorithm's essence is to extract all of the attributes of sample self-learning input data and use them as inspiration for artistic production. First, this paper briefly introduces the deep learning and evolution strategy and uses these algorithms in opera art creation to construct $1 + \lambda$. With the help of this evolutionary algorithm, an optimal solution is obtained through random evolution. The evolution strategy establishes the evolution function matrix. Starting from the situation of students learning opera art, this article examines the process of creating opera art using an in-depth learning and evolution technique. The results show that 96 percent of the students have contact with opera while watching an opera tour. During this, they were not interested in the performance of literary drama in traditional opera. However, it was noticed that they were deeply interested in martial arts, clown performances, and drama stage performances. Finally, the audience group of opera artistic creation is analyzed in the form of opera animation of "A Journey to the West: The Return of the Great Sage." It signifies that the opera's leading audience group is aged 25 to 29. However, they account for only 30 percent.

1. Introduction

Some consider opera outdated, yet it shows no signs of vanishing on the world stage. It continues to draw large crowds. Given its relationship with luxury, one can think of opera tickets as a status symbol. While the urge to rub shoulders with the upper crust may inspire the occasional operagoer, the true motivator for dedicated fans is passion—they do it for love. Some attest to a specific opera's ability to affect them—whether to song or tears—regardless of how many times they have seen it. Drawing on the incisive examination of these acts of love, this paper introduces new ways of thinking about people's relationships to art and demonstrates how, rather than just enriching parts of daily life, art helps us transcend them.

In China, opera culture has been created by accumulating national culture for thousands of years. It fully reflects virtuality, programmability, and comprehensiveness. It is the spiritual carrier of Chinese culture and has very high aesthetic, artistic, research, and educational value [1]. However, in recent years, young people have had an indifferent attitude towards opera art. They are unwilling to inherit and carry out China's opera culture and art. It has resulted in an inability to inherit China's traditional Opera art [2]. To resolve this problem, this paper uses deep learning and evolutionary strategy algorithm to study the artistic creation of traditional opera and analyze the process of artistic creation of traditional opera in China.

This paper also uses BP neural network and deep confidence network in deep learning. They are combined with

an evolutionary algorithm to study the problem of opera art creation. An evolutionary algorithm is an algorithm that imitates biological evolution mechanisms. It uses the concept of biological evolution and variation to modify parameter values and uses iterative evolution to obtain satisfactory results [3]. It can be used as an inspiration for opera art creation [4, 5]. Combining the two algorithms to analyze the process of opera art creation, we can get the relevant opera creation data.

The innovation of this paper is reflected in the following:

(i) It organically combines deep learning and evolution strategy to study drama art creation. It also describes the deep learning algorithm and neural network model to extract the drama art features in the initial model based on the deep learning algorithm, further evaluating the initial model's evolution features and constructing the evolution function matrix [6].

(ii) It completes the drama art creation based on the evolution strategy, using $1+\lambda$. The evolution strategy completes the mutation operation, establishes the artificial evaluation function matrix, and obtains the evolution matrix after training to complete opera art's evolution.

The remaining study paper is structured as follows: related work is explained in Section 2. This is followed by depth information and evolution strategy in Section 3. Section 4 describes the drama art creation based on depth information and evolution strategy. Similarly, Section 5 explains drama art creation analysis based on in-depth learning and evolution strategy. Finally, the conclusion of the study is written in Section 6.

2. Related Work

Opera culture is the main part of China's traditional culture and the most valuable national art. In the recent 20 years, the interaction between opera art, in-depth learning, and evolution strategy has attracted the attention of Chinese and foreign scholars. It has achieved many positive research results [7]. Few scholars have proposed that using opera art's implicit and explicit educational characteristics in college education is conducive to better-completing opera art creation [8]. The study of opera art involves explaining opera knowledge in class, appreciating famous opera masters, telling opera story plots, and analyzing the inner meaning of opera. At the same time, it also involves the compilation of opera literary scripts and the ensemble of musical instruments [9]. It has been pointed out that opera is an elegant art, symbolizing the national spirit. It is an essential form of artistic edification in people's growth. It can alleviate people's pressure on study and work and shape a good personality and character [10]. Therefore, as intangible cultural heritage, it should be protected. Presently, young people are not interested in opera art and culture. It impacts the inheritance of Chinese opera culture. By analyzing the characteristics of opera culture and modern culture and its disadvantages, we can find an ideal way to promote and publicize opera art [11]. Combining film art with traditional opera to develop a unique art form, namely, opera film, it takes rural areas as the central area, adheres to traditional culture, and finds a new channel to publicize and promote opera [12]. Some scholars have also pointed out that China's song art has distinctive characteristics. Traditional opera art has been dramatically affected by the impact of foreign opera art. Colleges and universities innovate teaching methods in opera teaching and integrate folk diet and opera art to generate a variety of opera artworks [13]. Several current Zaju in China endow the leading spirit to the drama, weaken the drama plot and contradiction, fully reflect the style of the times of Zaju, and become a typical representative in the history of Chinese drama [14]. Comparative analysis of opera theory studies the artistic fiction in opera creation, avoids the interference of subjective factors such as the author's voice and consciousness, and improves the quality of opera art creation. At the same time, it integrates the social and cultural customs and mentality into opera creation, so that readers at all levels can understand the significance of communication in opera artworks and jointly promote the rapid development of opera art in the Ming and Qing Dynasties [15].

3. Depth Information and Evolution Strategy

This section explains deep learning in detail to acknowledge its effects on drama art creation. Further, it describes the neural network model, BP network, and deep confidence network. All these algorithms in combination help demonstrate how the in-depth information and evolution strategy can grab viewers' attention towards the drama art creation. The explanation is as follows:

3.1. Deep Learning. In the 1950s, American scholars proposed a deep learning algorithm. It was used to analyze the results obtained in various ways. They proposed two learning modes, that is, deep learning and shallow learning [16]. Deep learning pays attention to stimulating teaching mode during teachers' learning. It does not pay attention to the passive inculcation teaching method of shallow learning. It seeks a learning route to improve students' learning efficiency in the classroom. Figure 1 shows the deep learning route (DELC) [17].

3.2. Neural Network Model. This subsection explains the BP Network and deep confidence network in detail. It can help us signify their importance and role in affecting drama art creation. It also shows how the young generation can be attracted to traditional culture. The explanation is as follows:

3.2.1. BP Network. BP network or backpropagation neural network is a feed-forward neural network. As a widely used learning algorithm, it corrects the connection weights between different layers of neurons in a multilayer network by fully utilizing the error of back-propagation to get the desired target values. There are two different propagation modes in learning backpropagation neural networks. They are as follows:

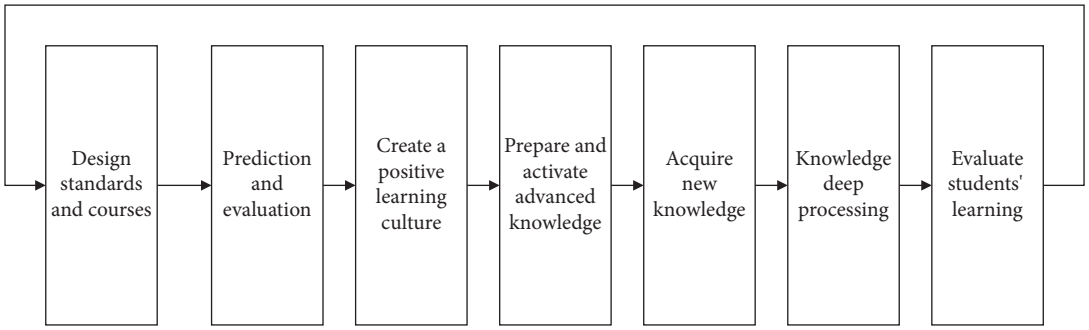

Figure 1: Deep learning route (DELC).

(i) *Forward Propagation Signal*: the data is analyzed and calculated after input samples are processed from the hidden layer. The result is calculated in the output.

(ii) *Error Back Propagation*: if the forward propagation results do not meet the standard requirements, an error higher than a certain threshold shall continue to reverse propagation. It indicates that the expected value is obtained. It transfers errors to each layer of neurons and corrects the network. Cyclic propagation of the two processes continues until the error is lower than the threshold.

Figure 2 is a BP network model in which the input layers are $x_1, x_2, \ldots, x_n$, the output items on the output layer are $y_1, y_2, \ldots, y_m$, and the numbers on the three layers of neurons are i, j, k, connected with the weights of neurons. U denotes the bias of neurons and inputs the sample x to the BP network. The output Y is obtained after analysis and calculation. Assuming y^* denotes the desired target result, the following is the basic formula for calculation error:

$$E(w,b) = \frac{1}{2}\sum_k \left(y_i - y^*{}_i\right)^2. \tag{1}$$

The neural network's bias value and weight parameters shall be corrected to minimize the error function. The network parameters shall be adjusted based on the gradient downregulation method. The following are the weight correction values of the i-th neural network and the j-th output neuron.

$$\Delta w(i,j) = -\eta \frac{\partial E(w,b)}{\partial w(i,j)}. \tag{2}$$

The following formula is obtained based on $\text{net}_j = \sum_i w_{ij} y_i$:

$$\frac{\partial \text{net}_j}{\partial w_{ij}} = \frac{\partial}{\partial w_{ij}} \sum_j w_{ij} y_i. \tag{3}$$

Hypothetical retransfer $\delta_j = (E_p/\text{net}_j)$ is obtained as follows:

$$\delta_i = y_i(1 - y_i) \sum_j \delta_j w_{ij}. \tag{4}$$

Therefore, the following weight correction values can be obtained:

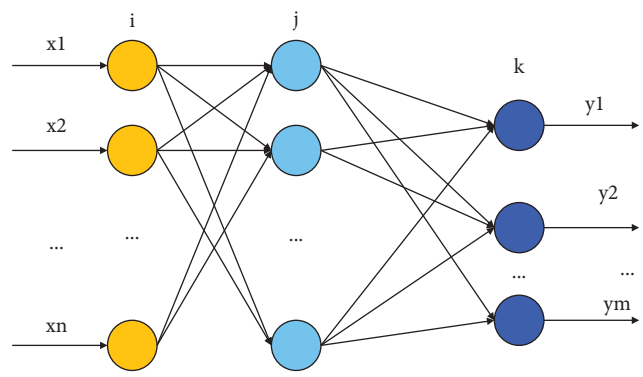

Figure 2: BP network structure diagram.

$$\Delta w_{ij} = \eta \delta_i y_i. \tag{5}$$

Presently, BP neural network is becoming more and more mature. The main advantage is that the network structure is very flexible and can independently adjust the number of network layers and the number of nodes on each layer. The disadvantage is that the convergence speed is too slow. If the training speed is set fast, it shall fall to a local minimum. On the contrary, it shall lead to different results and more layers, resulting in error dispersion. Therefore, it is always recommended to set the network structure according to the accumulated experience.

3.2.2. Deep Confidence Network. If there are many layers of the BP neural network, it shall lead to the problem of error dispersion. When adjusting the bottom parameters, the effect shall be reduced. It shall not be easy to extract data features accurately. A deep confidence network (DBN) is proposed to better deal with this problem. The network is formed by stacking multilayer restrictive Boltzmann machines that belong to the probability generation model. The data in the model is divided into label data and observation data, which need to be evaluated. In addition, the discrimination model only needs to evaluate label data. After comparing the backpropagation network with the deep confidence network, the latter has a better training effect and network hierarchy.

Boltzmann machines (RBMs) belong to stochastic neural networks. Restricted Boltzmann machines remove the

connections between neurons based on Boltzmann machines. In short, RBMs is a bipartite graph. RBMs comprise a hidden layer (h) and a visual layer (v). If the value on the network parameter is non-zero, that is, 1, it indicates the connection between layers. There is no connection between different nodes in the layer. $p(v, h)$ meets the requirements of Borel probability distribution; that is, the bipartite graph is RBMs.

There is an apparent RBMs structure in the single-layer Boltzmann machine. The structure should connect h hidden layer and explicit layer as different nodes are in an independent relationship. w represents the connection weight, w_{ij} is the connection weight between v_i hidden layer neurons, h_i HJ hidden layer neurons, b_i Bi is the bias of v_i hidden layer neurons, and a_i is the bias of h_i hidden layer neurons.

RBMs is the energy model, and the joint configuration energy is calculated by using the following formula:

$$E(v, h, \theta) = -\sum_{ij} w_{ij} v_i h_j - \sum_i b_i v_i - \sum_j a_j h_j. \tag{6}$$

The above equation e is the model parameter $\theta = \{w, a, b\}$. Different neurons are independent in the layer, as follows:

$$P(h|v) = \prod_j P(h_i|v). \tag{7}$$

Using the decomposition factor to find the probability result that the j-th node is 1 or 0,

$$P\left(h_j = 1|v\right) = \frac{1}{1 + \exp\left(-\sum_i w_{ij} v_i - a_j\right)}. \tag{8}$$

This definition meets the independent distribution sample set requirements $D = \{v^{(n)}\}$, and the value of n is 1,2, N. Here, the maximum likelihood estimation value must be calculated to obtain the required e parameters:

$$L(\theta) = \frac{1}{N} \sum_{n=1}^{N} \log P_\theta\left(v^{(n)}\right) - \frac{\lambda}{N} \|w\|^2{}_F. \tag{9}$$

Calculate the derivative of the maximum likelihood estimate and obtain the w value corresponding to the maximum L as follows:

$$\frac{\partial L(\theta)}{\partial w_{ij}} = Ep\left[v_i h_j\right] - Ep_\theta\left[v_i h_j\right] - \frac{2\lambda}{N} w_{ij}. \tag{10}$$

4. Creation of Drama Art Based on In-Depth Learning and Evolution Strategy

This section demonstrates the research process based on depth information and evolution strategy, art creation based on evolution strategy, and evolution function matrix. Together, they can help us clarify the creations of drama art based on in-depth information. The explanation is as follows:

4.1. Research Process Based on Depth Information and Evolution Strategy. This paper studies opera art in combination with in-depth learning and evolution strategy. It proposes the process of in-depth learning and evolution to jointly explore the inspiration of opera art creation [18]. The following is the process of creation of drama art based on in-depth learning and evolution strategy:

Step 1: Extract the features on the initial model based on the deep learning algorithm;

Step 2: Evaluate the characteristics of the initial model manually after evolution to form a test and a training set;

Step 3: The fitness value obtained by training the evolution function matrix is similar to the evaluation model;

Step 4: Evolution model: use fitness value to approximate, simulate, and evaluate the evaluation model to meet the requirements. After completing this operation, the results are returned to step 2;

Step 5: Results are obtained.

Figure 3 shows the research process of creating drama art based on in-depth learning and evolution strategy. The initialization model is extracted using a deep learning algorithm in the above process. Afterwards, the extracted model features are evolved to form a new model. The train model evolution function matrix is used to extract the fitness evaluation. Finally, the fitness model is used to guide the continuous improvement of the model, and drama art creation products are obtained in the process.

4.2. Creation of Art Based on Evolution Strategy. An evolutionary algorithm is the central part of evolutionary strategy. It uses the concept of biological compilation to modify the parameter values randomly. Iterative evolution produces a desirable result. The evolutionary algorithm mixed with the interactive process underpins the interactive evolution approach. It is used to increase people's subjective consciousness in order to regulate the evolution direction, minimize the quantity of algorithm parameter training, and make the algorithm converge faster [19]. The interactive evolution strategy in the field of image processing achieves ideal results. It has the ability of subjective judgment and searches for a solution. Also, the obtained solution is more practical. This paper uses $1 + \lambda$ which is the basic principle of this strategy. It is used to initialize the parameters to obtain the ideal individual. The iteration needs to be suspended if it is consistent with the conditions. On the contrary, the best individual shall mutate to generate a new individual into a new generation. Finally, the best individual is obtained.

As adopted in this paper, $1 + \lambda$, during the implementation of the evolution strategy, various mutation algorithms or evolution methods are used, such as uniform mutation, differential mutation, and Gaussian mutation.

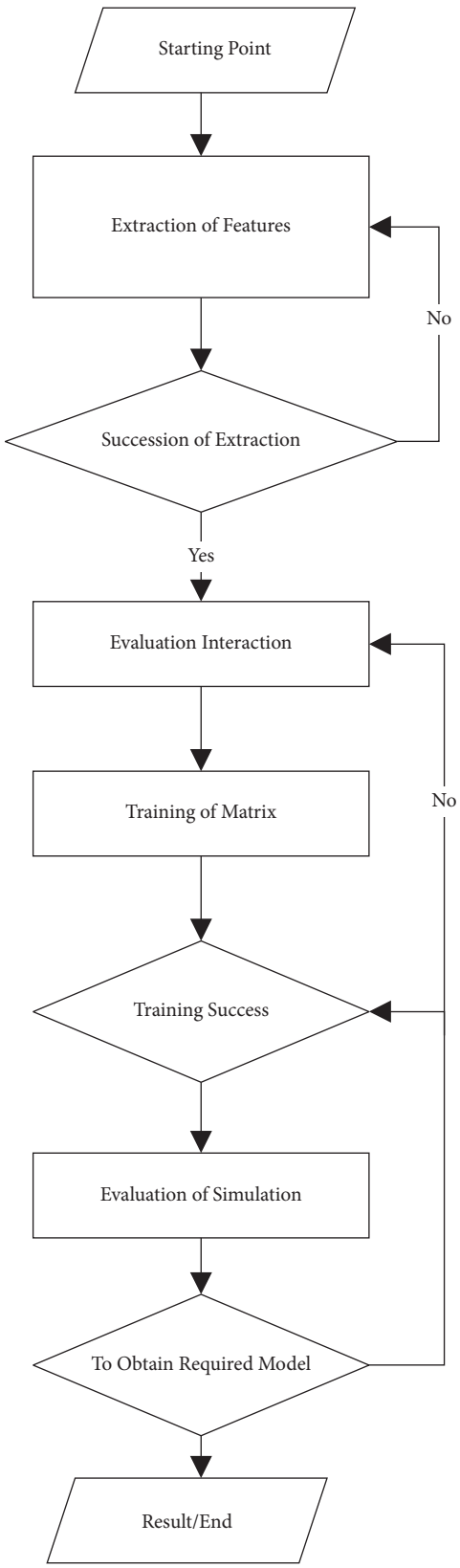

Figure 3: Flowchart of the overall approach.

Each mutation algorithm has different effects in each scene. Therefore, corresponding experiments must be used to complete the mutation operation in different stages. The most suitable algorithm is obtained based on the experimental results. The following are the basic principles of three mutation algorithms:

4.2.1. Differential Variation. If F is the scaling factor, the value of the i-th individual of generation m is represented by p_i^m, the i-th individual of generation $m-1$ is represented by p_i^{m-1}, the value of the j-th individual of generation $m-1$ is represented by p_j^{m-1}, the z-th individual of generation $m-1$ is represented by p_z^{m-1}, and both z and j are randomly selected values. Use the following formula to calculate p_i^m:

$$p^m{}_i = p^{m-1}{}_i + F * \left(p^{m-1}{}_j - p^{m-1}{}_z\right). \tag{11}$$

4.2.2. Gaussian Variation. In the evolutionary algorithm, $L(|n-\mu|/\sigma < 3) = 0.9975$, $y_{\max} = n+3$, $y_{\min} = n-3$. If C is the detection condition, d is the constraint condition, and y is the median value of Gaussian variation:

$$y = y_{\min} + 1.0 * \left(y_{\max} - y_{\min}\right) * \operatorname{rand}(0,1). \tag{12}$$

The following are constraints:

$$\begin{aligned} c &= \frac{1}{\sqrt[2]{2\pi}} * e^{(y-y\min)^2/2}, \\ d &= \frac{1}{\sqrt[2]{2\pi}} * \operatorname{rand}(0,1). \end{aligned} \tag{13}$$

Supposing that d is greater than c, the y value needs to be detected again. On the contrary, the output result of Gaussian variation is that g is equal to y.

4.2.3. Uniform Variation. Only a positive integer in an interval can be obtained in the uniform mutation evolutionary algorithm, affected by the particularity of mutation demand. Therefore, the algorithm is relatively simple, and the output result of y is represented by the following:

$$y = \operatorname{rand}(\,)\%n, \tag{14}$$

$1+\lambda$ The control parameters used in the strategy are mutation probability and population size, which must be determined manually. Generally speaking, the population size of the evolutionary strategy is smaller than that of other evolutionary algorithms.

4.3. Evolution Function Matrix. During the research of this paper, we need to analyze the experimental cases. The samples generated by manual evaluation have high investment. We need to use many samples in the experiment to reduce the number of manual evaluations. Therefore, we design the simulated artificial evaluation evolution function matrix, train the matrix to obtain the fitness approximate to the artificial evaluation model, and use the model to simulate

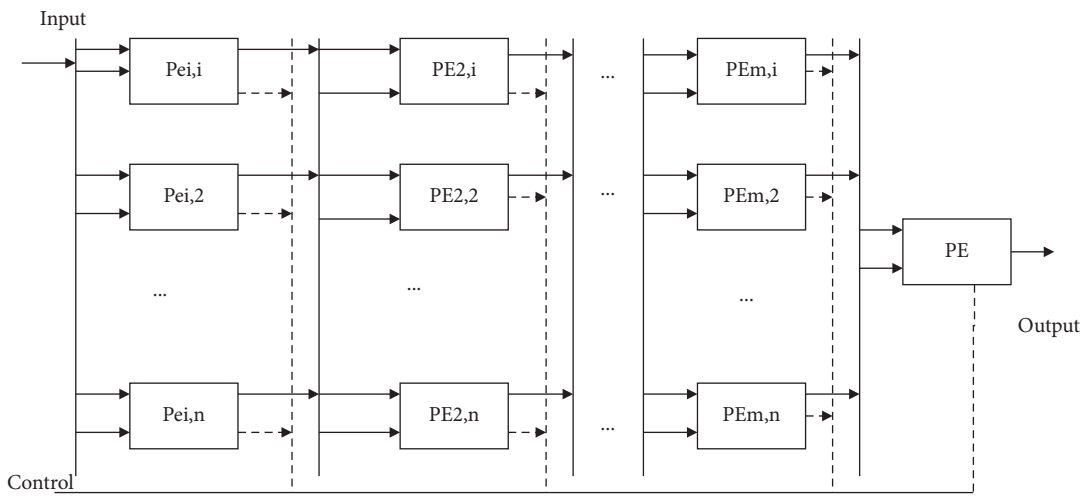

Figure 4: Function matrix of evolution.

Table 1: Processing unit operation.

Number	Function	Number	Function
0	x	4	Min (x, y)
1	$(x+y)>>1$	5	$X<<1$
2	$(x+y+1)>>1$	6	X or y
3	Max (x, y)	7	y

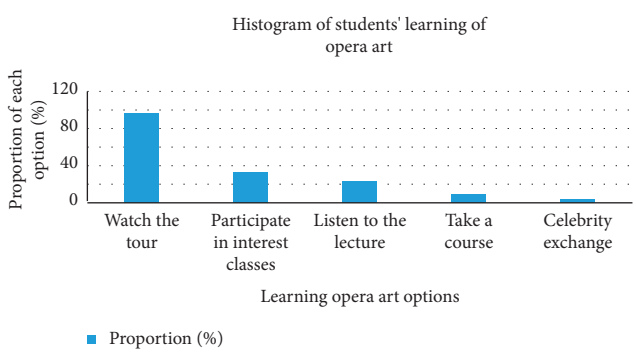

Figure 5: Histogram of students' learning of opera art.

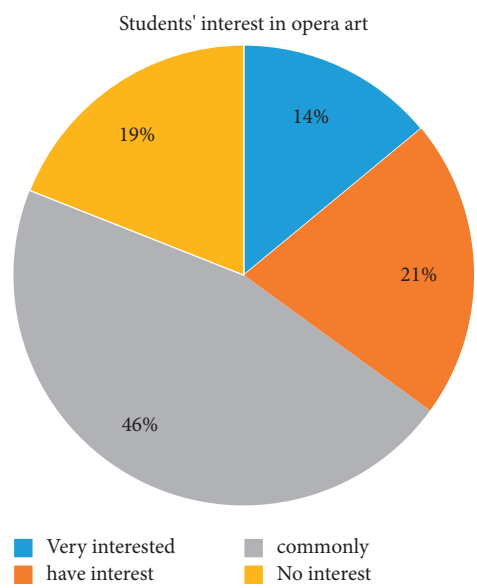

Figure 6: Students' interest in opera art.

the interactive evaluation process to improve the algorithm's operation efficiency [20].

It is imperative to construct the fitness approximation model. We should use the evolution matrix to learn the subjective evaluation characteristics and construct the evolution function matrix, that is, the process of training the evolution matrix. As shown in Figure 4, the evolution function matrix has 6 columns and 55 rows. There is only one processing unit in the last column. Vector is the input. Here, the data comes from the characteristics of an evolutionary neural network. Output is the score of the evolution function matrix after manual calculation and simulation, and control is the operation code of the control evolution function matrix.

The first five columns in the evolution function matrix have 55 matrix cells. The operation code on each matrix cell has an operation function, two operands, and four connection parameters. They correspond to the two offsets and weights of the two operands. The operands are obtained by random formula. The two dimensions on the input vector can be randomly obtained as operands. The operation functions of the processing unit are listed in Table 1. After selecting one of them randomly, if the output of the j-th matrix cell on the column i is represented by O_{ij} and f is the operation function, and the output of the matrix cell of two operands is randomly selected in the column $i-1$, represented by x_1 and x_2, then the two weights are w_1 and w_2, the two offsets are b_1 and b_2, the two connection parameters

Table 2: Students' behavior in watching drama tour.

Activity link	Activity form	Subject participation status	Participation
Introduction to opera culture	Drama Teacher's explanation	(1) Listen carefully	(1) Most
Pera classic performance	Theatrical performance	(1) Watch Carefully (2) Chat (3) Play	(1) Nearly half (1/2) (2) A small part (1/3) (3) Less part (1/5)
	Martial arts or clown show	(1) Watch Carefully (2) Chat (3) Play	(1) Most (2) A small part (1/6) (3) Very few parts
Unique performance of traditional opera	Stage performance	(1) Watch Carefully (2) Chat (3) Play	(1) Most (90%) (2) Very few parts

corresponding to the x_1 operand are b_1 and w_1, and the two connection parameters of the x_2 operand are w_2 and b_2. The following is the calculation formula:

$$O_{ij} = f\left(w_1 x_1 + b_1, w_2 x_2 + b_2\right). \tag{15}$$

One dimension of the output vector on the front row matrix cell is the value obtained on O_{ij}, and the output vector on this column is the input vector on the next column $i+1$ matrix cell until the end of this operation, and the output of the fifth column matrix.

In this paper, Gaussian variation $(1+\lambda)$ is used. The evolution strategy trains the evolution function matrix and constructs an evaluation model with similar fitness.

5. Drama Art Creation Analysis Based on In-Depth Learning and Evolution Strategy

This section sheds light on the analysis of students' learning and audience analysis of opera art. The analysis of students learning opera art examines 1000 test subjects who were listening to the opera art, watching tours, and lectures. The results show how many of them were interested in drama art. Similarly, the audience interest was also analyzed. The explanation is as follows:

5.1. Students' Learning Analysis of Opera Art. This paper adopts deep learning and evolution strategy analysis to study opera art creation. The algorithm is used to construct the evolution function matrix of opera art creation in order to select the content conducive to opera art creation. The experimental method is used to analyze the situation of students' learning opera art and investigate the form, interest, and degree of students' participation in opera art creation in a local school.

Several options are set during the experiment. It mainly includes watching tours, participating in interest classes, listening to lectures, participating in drama courses, and having famous experts' exchanges. During the experiment, 1000 students from a school were selected, of which 96% said they had watched the tour, 32.5% participated in the interest class, 22.8% said they had heard opera lectures, 9.5% said they had participated in opera courses before, and 3.7% had communicated with opera celebrities. The details are shown in the histogram in Figure 5.

After further investigation of the students' interest in learning opera art, it was revealed that 14% of these students are very interested in opera art, 21% are interested, 46% are generally interested in opera art, and 19% are not in opera art. The details are shown in Figure 6.

According to the statistical data in Figures 5 and 6, students are mainly exposed to opera by watching the tour and less systematically studying opera art. Only 9.5% and 90.5% of students have not systematically studied opera art. During the study period, the drama tour activities carried out by a school were sorted out, and the student behaviors in each activity link were classified and counted. It is shown in Table 2.

According to the survey data in Table 2 above, most students could carefully listen to opera teachers' explanations—about half of the students who carefully watch opera on the stage literary drama performance. Similarly, one-third of the students chat, and one-fifth of the students play. Most students observed it when entering the opera, martial arts, or clown performance. When it comes to opera stage performance, about 90% of the students observe it, and a few students are found chatting. The data shows that martial arts, clown performances, and stage performances in traditional Chinese opera attract students' attention and arouse their interest in traditional Chinese opera art.

5.2. Audience Analysis of Opera Art. Opera art creation is combined with animation to launch opera works with more innovative effects and meet the aesthetic requirements of modern people [21]. When analyzing the audience of opera art, this paper selects "Journey to the West: The Return of the Great Sage" as an example to illustrate that this work is a typical representative of the combination of opera and animation. It can fully display the characteristics of opera art and animation. The analysis results of the opera audience are shown in Figure 7.

Figure 7 shows that the degree of interest of those under 19 years old in the return of the great sage of journey to the west is 3.1%, and the audience aged 20–24 is 26.1%. 30% of those aged 25–29, 17.2% of those aged 30–34, 9.8% of those aged 35–39, and 13.8% of those aged over 40. Opera is a unique culture in China. It enhances the sense of national cultural identity. The animation form of traditional opera breaks the traditional opera viewing form in order to attract

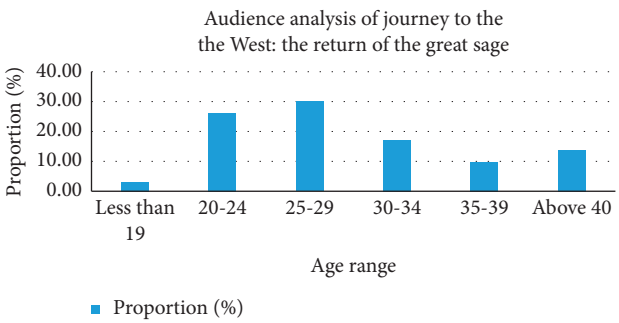

Figure 7: Audience analysis of Journey to the West: The Return of the Great Sage.

audiences of all ages and indirectly cultivate a large number of audiences who love opera culture. People with more contact with opera forms shall also have a strong interest in opera. It is conducive to the inheritance and development of opera culture.

6. Conclusion

In essence, the principal mission of modern music education and music educators is to arouse our young generation's interest and passion for the art of music via the application of the most sophisticated current achievements in music education, instilling in the youth a high spiritual and aesthetic educational formation. In the case of traditional heritage, opera art is a special "civilized memory" and "cultural heritage" in China. It has a history of thousands of years and has a profound cultural inheritance. Foreign culture has a significant impact on Chinese opera art due to the rapid development of globalization. It makes opera art face a huge development dilemma and survival crisis. Based on the in-depth learning and evolution strategy, this paper studies the artistic creation of opera, establishes the evolution function model of artistic creation, and analyzes the primary forms of students' contact with opera. Among these, 96 students learned the artistic charm of opera on the opera tour. Finally, to analyze the drama art creation audience group, we choose the drama animation form of "Journey to the West: The Return of the Great Sage." The results show that the leading audience group for drama is between 25 and 29, which accounts for 30%. It indicates that the drama audience group is getting the younger generation's attention after its creation.

Data Availability

The datasets used or analyzed during the current study are available from the corresponding author upon reasonable request.

Conflicts of Interest

The authors declare that there are no conflicts of interest for the publication of this paper.

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