Kurdish Studies
January 2023
Volume: 11, No: 01, pp. 254-265
ISSN: 2051-4883 (Print) | ISSN 2051-4891 (Online)
www.KurdishStudies.net

Received: May 2023 Accepted: September 2023
DOI: https://doi.org/10.58262/ks.v11i1.1019

Analysis of the Corporate Communication and Operational Value of the Chinese Epic Opera "The Long March" under the Perspective of Diversified Music

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Abstract

In this study, a convolutional neural network is used to extract song label features in audio signals under a multivariate music perspective, and a traditional SIR model is improved to more accurately model information propagation. Music labels are normalized and factors such as node strength and edge weight differences are introduced to reflect the complex propagation process more accurately. In the enterprise propagation dynamics model, the multivariate music perspective is considered, and the practical application value of the model is increased by controlling the number of infected nodes in the neighbors of the state nodes. The parameter is increased from -1 to 1, which reduces the propagation critical value and actively promotes the information dissemination of the epic opera The Long March, providing a reference for the corporate communication strategy in the field of pluralistic music.

Keywords: *convolutional neural network, SIR model; multivariate music, epic opera The Long March, corporate communication*

Introduction

Throughout the history of China's opera development, the number of masterpieces can be said to be as vast as an ocean, and their masterpieces can be said to be splendid and colorful. A large number of masterpieces in the history of Chinese opera development, as a model for the spread of national opera, have powerfully promoted the ideals of Chinese national spirit, conveyed lofty beliefs and strong will, and constructed the aesthetic character and collective memory of several generations of people. It should be said that the spiritual power conveyed by every opera work, especially the excellent and widely sung opera works, has a lasting light (Balokhonov, Romanova, & Zemlianov, 2021; Vella, 2022). Opera is a comprehensive audio-visual music art, which is a poetic and elegant art and a performing art full of suspenseful display of life destiny (Rosand, 2021; Steigerwald Ille, 2020). With dramatic vocal melody, unique character and singing performance with dramatic colors, a legendary story is written (Sinyavski, Shatrov, Kremnev, & Pronchenko, 2020). An excellent opera covers the artist's positive attitude towards life, strong ideal pursuit and high standard of moral judgment. Characters portrayed by excellent opera works are vivid, dynamic and touchable (Francisco, 2021; Gentili, 2021).

Compared with a song, an opera is usually richer and deeper in its artistic ideological connotation, fuller and more powerful in artistic temperament, and plays a more enormous social function and value (Soares-Quadros Jr, Sá, & Román-Torres, 2023). Through an opera, one can understand the historical background of the opera story, the characters portrayed, and the ideological connotations conveyed, so as to gain spiritual and spiritual enlightenment and purification (Annunziata & Colombo, 2021; Im, Song, & Jung, 2020). Due to the intuitive and figurative characteristics of art, it is very easy to penetrate into people's hearts and minds, and an excellent work of art can improve people's moral level and spiritual realm, and even influence a generation or several generations (Pistorius, 2019). Excellent opera works with unstoppable spiritual power to sow the flower of energy, sprouting never-ending, stimulating spiritual energy, therefore, an excellent

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opera produces a great artistic value is immeasurable (Rosenberg, 2019; Wolkowicz, 2022).

(Ottomano, 2018) Listening to music activates nerve cells in the anterior temporal lobe of the brain, and different kinds of music can help to regulate emotional instability and help to regulate mood disorders and stress levels in physical and mental health. Kyaw, K determined the association between happiness and different musical experiences to explain the development of public policies that promote happiness. Binary, univariate and multivariate logistic regression analyses were applied with SAS software and it was found that the level of happiness had a highly significant relationship with yearly and monthly intervals (Kyaw, 2020). The subject matter of opera history was explored under multi-media conditions, breaking away from the traditional paradigm of teaching music historiography. Although most of the examples are drawn from classic Romantic works, in modern theater works. There are also new, multimedia representations that can further the trainee's understanding of the multimedia qualities of opera. Hautsalo, L et al. take three main categories, namely, temporal identity, temporal disjunctions and temporal discontinuities as examples (Hautsalo & Westerlund, 2021). Schubert, in his early works, made more use of the structure of two rotations, i.e. combining one type of sonata with another. Thus based on a new, hybrid type between the first and the second structure (Boni & Sammut, 2019), Hyland, A. M proposes a new conceptual type model with a specific context of the times. One is from classical musical forms, especially in the preludes of operas. The second is from the trends of Schubert's late music in terms of form and tonality (Hyland, 2021) used effort as a mediator to modulate the role of music on task performance and designed a computerized on-line interface that enabled to deal with a stressful event. The results showed that participants performed very positively when music was present. So in a stressful situation, turning off the music would help task performance (Arboleda, Arroyo, Rodriguez, & Arce-Lopera, 2022). Acton, K et al. suggest that in a chamber opera composed by Dave Clark in a mixture of American English and sign language, the sense of touch and visual projection, as well as the sense of rhythm, are included in addition to music and sound. This sensory integration expands the idea of sound and music and explores the differences in the perception of the vocal tract and the voice channel due to the listener's environment and knowledge of the vocal tract (Acton, Howarth, & Ouchi, 2020).

This paper analyzes the Chinese epic opera "Long March" in the diversified music perspective in many aspects, and researches the corporate communication and operation value by constructing different models. Firstly, the deeper hidden feature values are extracted through the training of multiple neural network layers of convolutional neural network to alleviate the occurrence of overfitting phenomenon. And after completing the audio signal feature extraction, the music acoustic image is extracted through a series of audio conversion operations, which is processed by image segmentation to get the potential features of music through fusion, and the recommendation model under the diversified music view is obtained (Yahdi, Sulyok, Smith, & Bugenis, 2014). Secondly, the actual dissemination behavior of information related to the Chinese epic opera "Long March" on the corporate network is considered. On the basis of the SIR model, the effect of reflecting the propagation behavior on the difference of node strength and edge power is introduced to obtain the enterprise propagation dynamics model under the diversified music perspective, and the enterprise propagation critical value of the Chinese epic opera The Long March is deduced. Finally, the model constructed in this paper is verified by simulation experimental analysis of corporate propagation and operation value, which proves that the model constructed in this paper is more suitable for describing corporate propagation dynamics, and can better promote the propagation of the opera and the Chinese epic opera "The Long March".

Recommendation model for communication in the perspective of diversified music

Diversified Music Recommendation Model

Music feature extraction

Convolutional neural network is one of the more popular deep learning models, through the training of multiple neural network layers, it can extract complex abstract features better reflecting the mapping relationship between a large number of inputs and outputs, and because of its unique hierarchical structure, it can be used to extract deeper hidden feature values, which are widely used in the field of music recommendation. Compared with the traditional collaborative filtering music algorithm, the CNN model can utilize the convolutional layer for convolutional computation instead of the traditional complex matrix

decomposition, and the model can perceive the 2D music and user feature data well (Mostardeiro, Antoniolli, & Xavier, 2020).

After a number of convolutional layers, although the dimensionality of the music feature vectors is reduced compared to the features at input, however, the feature dimensions are still large. Therefore, a pooling layer occurs after each convolutional layer, which is used to compress the number of neurons and parameters processed in the previous layer, maintain the invariance of feature rotation, translation, and scaling, and mitigate the occurrence of overfitting phenomena. A music feature vector is obtained after the convolution operation of different convolution kernels, which generally consists of a number of convolution optimization operations and a number of pooling operations alternately, and the tail of the training operation is a fully connected layer, which can be used for logistic regression, softmax and other regression operations. The training flow of the convolutional neural network is shown in Figure 1.

The convolution layer can weight and sum the input music feature vectors, and the pooling layer adopts the method of maximum pooling, after the pooling operation can get the reduced dimensional music features are also the input features of the next layer of the network, and the network after the pooling operation has the maximum value. Subsequently, the system will determine whether the next layer is a tail perceptron or not, if the system determines that it is a tail perceptron, all the music features of a music training set in a music training block will be connected, and the obtained music fusion feature vector will be multiplied by the weight of the perceptron in the upper layer, together with the bias of the tail fully connected layer.

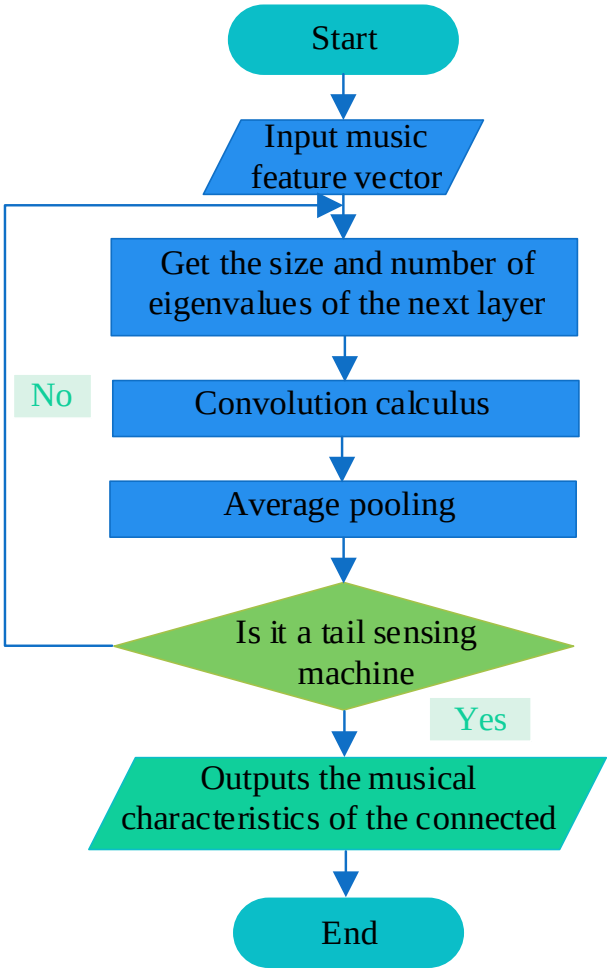

Figure 1 Training flow of convolutional neural network

The audio feature extraction model is based on convolutional neural network for extraction, the audio feature extraction network model is locally sensed by three convolutional layers, each of which alternates with the same pooling layer, and finally the feature extraction of the audio signal is completed by two fully connected layers. The pre-processed acoustic signal from the music dataset is used to extract the music

acoustic image through a series of audio conversion operations. Since the acoustic image data is too large, it needs to be processed by image segmentation. The segmented acoustic image segments are fed into the convolutional neural network model, and the audio information is extracted by convolutional operations in the convolutional layer. As the size of the audio feature map obtained by different sizes of convolution kernel is not the same, use the pooling layer to complete the cascade unification of the audio feature map and calculate the pooling maximum of the audio feature map, and finally get the music audio features in the fully connected layer, the structure of the audio feature extraction is shown in Fig. 2.

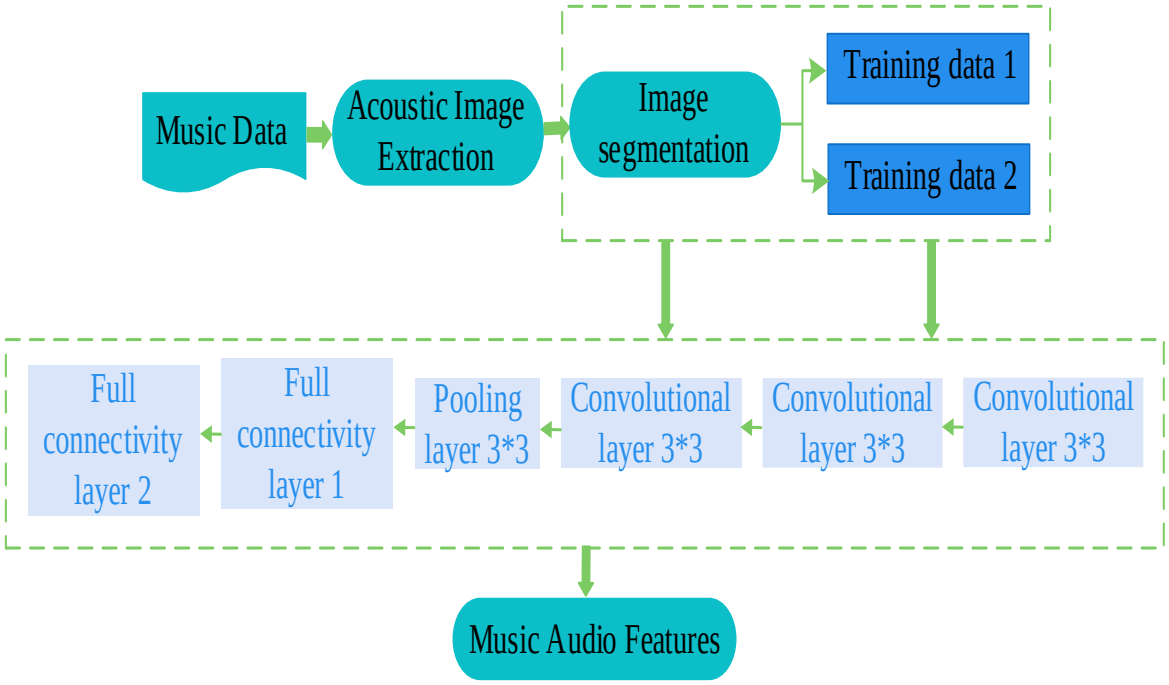

Figure 2 Structure of audio feature extraction

Standardization of music data

The music data is normalized and the audio is processed by frame splitting, windowing and Fast Fourier Transform to get the music audio feature vectors, the music labels are divided into training set and test set. The coded feature vectors and word embedding vectors are obtained respectively, the fusion of features is performed in the fusion gate, and the fusion vectors of music are obtained in the fully connected layer. Do data normalization on user dataset, initialize the parameters, introduce the dwell time parameter Φ_{t+1}, dwell frequency parameter Φ_{t+1} and music fusion vector, calculate the candidate music set and finally output the music recommendation list by sorting.

Recommendation Model Construction

The main task of the music recommendation model is to recommend favorite songs for the user, the song tag set and audio signal in the music dataset are used as the training set of the two-branch neural network to complete the extraction of effective music potential features, and the historical listening information of the user in the music dataset is used to predict the user's preference list (Gao, 2022; Long & Wang, 2021). The historical listening information includes the ID of the song that the user listened to as well as the playing time and the number of times it was played, and Fig. 3 shows the recommendation structure of the music dataset.

After completing the extraction of audio signal and song label features respectively, the extracted effective music features are fused to get the potential features of music (Zhang, 2022). The user's behavioral information is divided into the user's rating of the music and the user's history of listening to the song information, and the effective user behavioral information is obtained through training. The music potential features and user behavioral information are trained to get the candidate music list, and then the Top-N recommendation list is obtained by descending sorting (Akman, 2014).

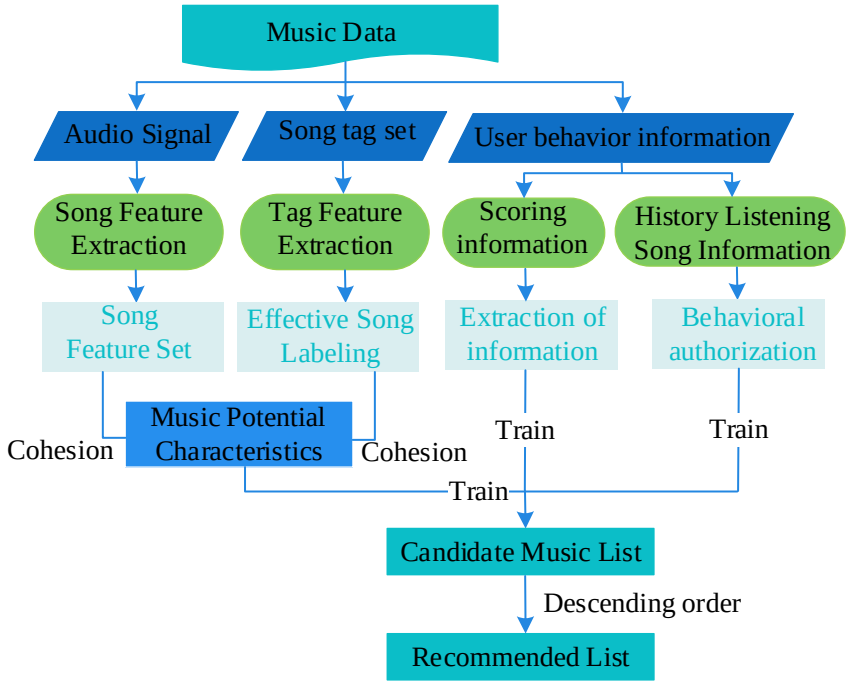

Figure 3 Recommendation model architecture for music dataset

A model of corporate communication dynamics

Use nodes to represent organizations or individuals in the enterprise network, if there is an opera supply and demand transaction relationship between two nodes, an edge is established between these two nodes, two nodes connected with an edge are regarded as adjacent in the network, the weight of the edge is measured by the amount of transaction of the product between the two nodes, and the larger the edge weight, the closer the connection between the two nodes is indicated, so as to obtain the enterprise weighted complex network. One or several nodes in the enterprise network are randomly selected as nodes that have already received opera-related information, and the rest are nodes that can easily receive opera-related information (Kearney, 2019). At each time period, a node that has already received opera-related information turns its neighboring nodes that are prone to receive opera-related information into nodes that receive opera-related information with a certain contagion rate. The larger the contagion rate is, the smaller the exit rate is, and the relevant information spreads and eventually maintains an equilibrium state in the enterprise network. Otherwise, after a period of time, the opera will disappear from the market (Chen, Zhao, Wang, & Zhao, 2022).

Considering the actual propagation behavior of opera-related information on the enterprise network, the SIR model is not completely suitable for describing the propagation behavior of Chinese epic opera, and the influence of reflecting the propagation behavior on the difference of node strength and edge power must be introduced on the basis of the SIR model (Lin & Colbert, 2018). In the SIR model, the infected node will infect all nodes adjacent to it at each time step, and the propagation rate of the node is equal to the degree of the node, and the propagation rate of the node and the degree of the node are linearly related. Each time step I state node with degree k cannot infect all neighboring nodes connected to it, and its propagation rate is always between $1 \sim k$. Therefore, the node propagation rate index α is introduced to control the nonlinear relationship between the propagation rate of the I state node and the degree of the node. The node's propagation rate reflects the node's propagation ability, the larger the node's propagation rate the stronger its propagation ability. Edge power reflects the closeness of the connection between two nodes, the larger the edge power, the closer the connection between two nodes, and the S state node connected to the I state node is more inclined to become the I state node, and the edge power index β is introduced to control the nonlinear relationship between the node degree and the edge power.

According to the behavior and topological structure characteristics of enterprise propagation dynamics, based on the SIR model, the index α reflecting the propagation rate of nodes and the edge weight index β are introduced. To establish the enterprise propagation dynamics model based on the mean field theory

there:

$$\frac{dS_k(t)}{dt} = -kS_k(t)\sum_{k'} p(k'|k)I_{k'}(t)\frac{\varphi(k')}{k'}\lambda_{k'k} \quad (1)$$

$$\frac{dI_k(t)}{dt} = -I_k(t) + kS_k(t)\sum_{k'} p(k'|k)I_{k'}(t)\frac{\varphi(k')}{k'}\lambda_{k'k} \quad (2)$$

$$\frac{dR_k(t)}{dt} = I_k(t) \quad (3)$$

Where $S_k(t)$、$I_k(t)$、$R_k(t)$ denotes the density of nodes belonging to states S、I and R respectively at time t of degree $\varphi(k')$ denotes the propagation rate of nodes of degree k', and $\lambda_{k'k}$ denotes the propagation rate of the opera and information related to The Long March from nodes of degree k. Edge weights can be expressed in terms of the degree of a node, so that the weight of an edge between two nodes of degree k and k' is $w_{k'k} = w_0(kk')^{\beta}(-2 < \beta \leq 2)$. where $w_{k'k}$ denotes the weight of an edge between two nodes of degree k and k', and the parameter w_0 and the index β are determined by the structure of the particular enterprise network. w_0 is the value of edge weights at the initial moment, $w_0 \in (0, \infty)$. The exponent β reflects the nonlinear relationship between node degree and edge weights, and $-2 < \beta \leq 2$ controls the relationship between node degree and edge weights in a reasonable range. The edge weights between two nodes with degrees k and k' are always within the interval $w_0(kk')^{-2}, w_0(kk')^2$; therefore, the introduction of the edge weight index β to describe the nonlinear relationship between node degrees and edge weights is in line with the actual situation of enterprise propagation.

The strength of a node of degree k is equal to the sum of the weights of all edges connected to it, i.e., $N_k = k\sum_{k'} p(k'|k)\, w_{k'k}$, where N_k is the point strength of a node of degree k. Therefore, $N_k = w_0\left\langle k^{1+\beta}\right\rangle k^{1+\beta} / \left\langle k\right\rangle$. The total propagation rate of nodes of degree k is λk. The propagation rate on the edges from nodes of degree k to nodes of degree k' will be distributed according to the weights of the edge weights of all the edges connected to the nodes of degree k, then there is $\lambda_{kk'} = \lambda k \cdot w_{kk'}/N_k$. Therefore, the greater the propagation rate obtained by the edge weights $w_{kk'}$ connected to node N_k, the more likely that nodes of degree k' will turn out to be nodes receiving the information related to the Opera and The Long War, then there is:

$$\lambda_{kk'} = \lambda k\frac{w_{kk'}}{N_k} = \lambda k\frac{\left\langle k\right\rangle w_0\left(kk'\right)^{\beta}}{w_0\left\langle k^{1+\beta}\right\rangle k^{1+\beta}} = \frac{\lambda k'^{\beta}\left\langle k\right\rangle}{\left\langle k^{1+\beta}\right\rangle} \quad (4)$$

When $\beta > 0(\beta < 0)$, the nodes prefer to become a network of nodes receiving information about the opera and The Long Walk. An edge whose propagation rates in both directions are unequal has $\lambda_{kk'} \neq \lambda_{k'k}$.

In the SIR model, $\varphi(k)$ represents the propagation rate of the node with degree k, and the infected node with degree k will infect all k nodes connected to it at each time step, and the propagation rate of the node and the degree of the node are linearly related. However, in the diversified music perspective, the node with degree k that has received information about the opera and The Long March cannot infect all k nodes connected to it at each time step, and the node propagation rate and node degree are described by the following equation:

$$\boldsymbol{\varphi(k) = k^{\alpha}; 0 < \alpha \leq 1} \quad (5)$$

Equation (5) shows that at each time step each I state node establishes a connection with k^{α} neighboring nodes, and the exponent α controls the propagation ability of nodes with different degree I states. When $\alpha \to 0$, only one of the k neighboring nodes of the I -state node with degree k is infected. When $\alpha = 1$, $\varphi(k) = k$, all k neighbor nodes of the I -state node with degree I are infected. Therefore, $0 < \alpha \leq 1$ controls the number of infected nodes among the neighboring nodes of the I state node at $1 \sim k$, which is in line with the actual situation of the diversified music viewpoint.

Introducing the expressions of Eq. (4) and Eq. (5) about $\lambda_{kk'}$ and $\varphi(k)$ into Eqs. (1)~(3) and organizing them so that $\mu = 1$, we obtain:

$$\frac{dS_k(t)}{dt} = -\frac{\lambda k^{1+\beta}}{\langle k^{1+\beta}\rangle} S_k(t)\theta(t) \quad (6)$$

$$\frac{dI_k(t)}{dt} = -I_k(t) + \frac{\lambda k^{1+\beta}}{\langle k^{1+\beta}\rangle} S_k(t)\theta(t) \quad (7)$$

$$\frac{dR_k(t)}{dt} = I_k(t) \quad (8)$$

where $\theta(t) = \sum_k k^{\alpha} P(k) I_k(t)$, the corporate communication dynamics model under diversified music perspective is obtained, and the following derives the corporate communication critical value of the Chinese epic opera The Long March [22].

Equation (9) combines the initial conditions $R_k(0) = 0$, $I_k(0) = I_k^0$ and $S_k(0) = 1 - I_k(0) - R_k(0) = 1 - I_k^0$ of the diversified music perspective. which is very small in general, then there are:

$$S_k(t) = exp\left(-\frac{\lambda k^{1+\beta}}{\langle k^{1+\beta}\rangle}\varphi(t)\right) \quad (9)$$

where $\varphi(t) = \int_0^t \theta(t)dt = \sum_k k^{\alpha} P(k)\, R_k(t)$. To obtain the propagation critical value, compute the first order derivative of $\varphi(t)$ with respect to t, which can be obtained:

$$\begin{aligned}\frac{d\varphi(t)}{dt} &= \sum_k k^{\alpha} P(k)\,[1 - R_k(t) - S_k(t)] \\ &= \langle k^{\alpha}\rangle - \varphi(t) - \sum_k k^{\alpha} P(k)\, S_k(t) \\ &= \langle k^{\alpha}\rangle - \varphi(t) - \textstyle\sum_k k^{\alpha} P(k)\, exp\left(-\frac{\lambda k^{1+\beta}}{\langle k^{1+\beta}\rangle}\varphi(t)\right)\end{aligned} \quad (10)$$

When t is large enough, the propagation of Chinese epic opera and information related to The Long March in the diversified music perspective reaches a steady state, then there are $I_k(\infty) = 0$ and $\lim_{t\to\infty} \frac{d\varphi(t)}{dt} = 0$, and thus φ can be obtained from equation (10):

$$\boldsymbol{\varphi} = \langle k^{\alpha}\rangle - \textstyle\sum_k k^{\alpha} P(k)\, exp\left(-\frac{\lambda k^{1+\beta}}{\langle k^{1+\beta}\rangle}\varphi\right) \quad (11)$$

$\varphi = 0$ is a trivial solution of Eq. (11) if Eq. (11) has a nontrivial solution if and only if the second-order derivative of φ is satisfied at $\varphi = 0$:

$$\frac{d^2}{d\varphi^2}\left(\langle k^{\alpha}\rangle - \textstyle\sum_k k^{\alpha} P(k)\, exp\left(-\frac{\lambda k^{1+\beta}}{\langle k^{1+\beta}\rangle}\varphi\right)\right)_{\varphi=0} > 1 \quad (12)$$

If equation (12) holds, then there is:

$$\textstyle\sum_k P(k)\,\lambda \frac{k^{\alpha+\beta+1}}{\langle k^{1+\beta}\rangle} = \lambda \frac{k^{\alpha+\beta+1}}{\langle k^{1+\beta}\rangle} > 1 \quad (13)$$

From Equation (13), the critical value of the corporate communication of "Long March" in the diversified music perspective is obtained:

$$\lambda_c = \left\langle k^{\beta+1}\right\rangle / \left\langle k^{\alpha+\beta+1}\right\rangle \quad (14)$$

Considering a corporate propagation threshold with a degree distribution of $P(k) = ck^{-\gamma}$, there is:

$$\left\{\left\langle k^{\beta+1}\right\rangle = c\left(\left\langle k_{max}^{\beta+2-\gamma}\langle\rangle\left\langle k_{min}^{\beta+2-\gamma}\langle\rangle\right\rangle\right\rangle/(\beta+2-\gamma)\right|\left\langle k^{\alpha+\beta+1}\right\rangle = c\left(\left\langle k_{max}^{\beta+2-\gamma}\langle\rangle\left\langle k_{min}^{\beta+2-\gamma}\langle\rangle\right\rangle\right\rangle/(\alpha+\beta+2-\gamma)\right)\{\right) \quad (15)$$

where $kmin_{max}$ denotes the maximum and minimum degrees of the network nodes, respectively. Substituting into Eq. (14) yields the critical value of corporate propagation for more general structures as:

$$\lambda_c = \frac{\alpha+\beta+2-\gamma}{\beta+2-\gamma} \times \frac{k}{max^{\frac{k_{max}^{\alpha+\beta+2-\gamma}}{\beta+2-\gamma}} k_{min}^{\beta+2-\gamma}} \quad (16)$$

From Eq. (16), if $\gamma < \alpha + \beta + 2$, the corporate propagation threshold λ_c tends to 0 in a sufficiently large Chinese epic opera. if $\gamma > \alpha + \beta + 2$, the propagation threshold λ_c is a finite value and $\lambda_c \approx k_{min}^{-\alpha(\alpha+\beta+2-\gamma)(\beta+2-\gamma)}$. Therefore, the propagation threshold is bounded by $\gamma = \alpha + \beta + 2$.

The corporate propagation dynamics model constructed in this paper has more flexibility to change the propagation critical value by adjusting the propagation rate index α of the nodes that have already received information related to the opera or The Long March, and the network weight index β. When $\alpha = 1, \beta = 0$, $\lambda_c = \langle k \rangle / \langle k^2 \rangle$, the propagation scale $N \to \infty$, there is no propagation critical value, and the enterprise propagation dynamics model degenerates into the SIR model. When $\alpha + \beta = 0$, then $\lambda_c = \langle k^{1+\beta} \rangle / \langle k \rangle = \langle k^{1-\alpha} \rangle / \langle k \rangle \geq 1/\langle k \rangle$. When $\alpha + \beta = -1$, then $\lambda_c = \langle k^{1+\beta} \rangle = \langle k^{1-\alpha} \rangle / \langle k \rangle \geq 1/\langle k \rangle \geq 1/\langle k \rangle$. This indicates that in the range of values of parameters α and β, when $\alpha \neq 1$ and $\beta \neq 0$, the corporate communication critical values of the Chinese epic opera "Long March" under the diversified music perspective are all finite positive values. The model constructed in this paper is more suitable for describing the dynamics of corporate communication, and the analyzed critical values of corporate communication coincide with the reality.

Experimental analysis of the simulation of corporate communication and operational value of The Long March

Corporate Communications Validation

To analyze the corporate propagation of The Long March, a corporate complex network with $N = 2 \times 10^4$ node and node average degree $\langle k \rangle = 6$ is generated to analyze the relationship between parameters α and β and the propagation threshold λ_c, and to verify the correctness of Equation (16). The simulation curves are the average of 200 independent simulation experiments. The simulation curves visualize how parameters α and β affect the propagation threshold λ_c, and continue to analyze how parameters α and β jointly affect λ_c.

Figure 4 shows the simulation results of the parameters versus the propagation thresholds, when $\beta = 0$, as α increases from 0 to 1, the LRD corporate propagation threshold λ_c decreases very quickly from a larger value to a smaller value, which means that a larger α leads to a smaller LRD corporate propagation threshold λ_c. It is also observed that it is finite-positive even at a larger α. The data in the figure can be analyzed $\alpha = 0.85, \lambda_c \approx 0.1$. In this case, the critical value of α is $\alpha_c = \gamma - \beta - 2 = 1$, and at $\alpha < \alpha_c = 1$, λ_c is a non-zero positive value. At the same time the critical value of β is $\beta_c = \gamma - \alpha - 2 = 0$, when $\beta < \beta_c = 0$, the critical value of corporate propagation of The Long March λ_c is a non-zero finite positive value, and $\beta \geq \beta_c = 0$ there is no critical value of corporate propagation of The Long March. When $\alpha = 1$ this is the case, the Long March corporate propagation critical value λ_c decreases very quickly as β it increases to 0, and the propagation critical value λ_c decreases slower as it β increases from 0 to 1. Moreover, when $\beta > 0$ the Long March corporate propagation threshold λ_c is very small. It can be seen that any unilateral change in the value of α or β will lead to a large fluctuation in the propagation critical value λ_c of the Long March enterprise, and when α changed, the propagation critical value λ_c changes even more, so that the parameter α is more sensitive than the parameter β to the effect of the propagation critical value of the Long March enterprise.

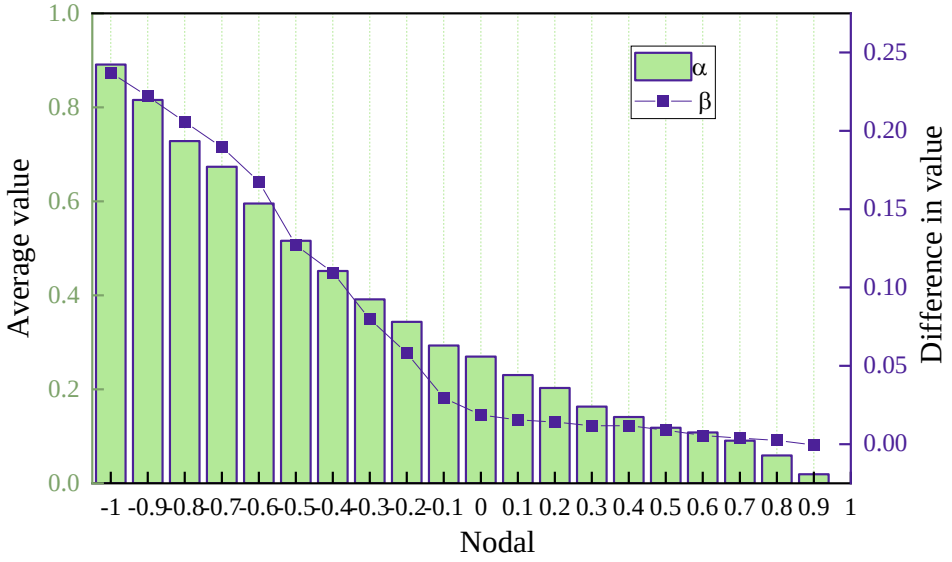

Figure 4 Simulation results of parameters versus propagation thresholds

Figure 5 shows how parameters α and β together affect the results of λ_c, with different λ_c values indicated by different depth colors. In the upper right corner, λ_c is close to 0, and here $\alpha + \beta > 1$. In the lower left corner, λ_c has the largest value, and here $\alpha + \beta$ has the smallest value, which shows that λ_c is regulated and controlled by α and β together. Parameters α and β absolutely affect the critical value of information dissemination related to the opera and The Long March in the diversified music perspective, and any unilateral change of the value of α or β will lead to a great fluctuation of the dissemination critical value λ_c. When α increases from 0 to 1, the propagation critical value λ_c of The Long March enterprise is getting smaller and smaller, and when β increases from -2 to 2, at first the propagation critical value λ_c of the Chinese epic opera The Long March enterprise decreases very fast, and then decreases more and more slowly. Thus parameter α is more sensitive to the effect of propagation critical value than β, which also indicates that increasing the propagation capacity of a node is more important than increasing the closeness of the connection between two nodes to promote the dissemination of information related to the opera and the Chinese epic opera The Long March.

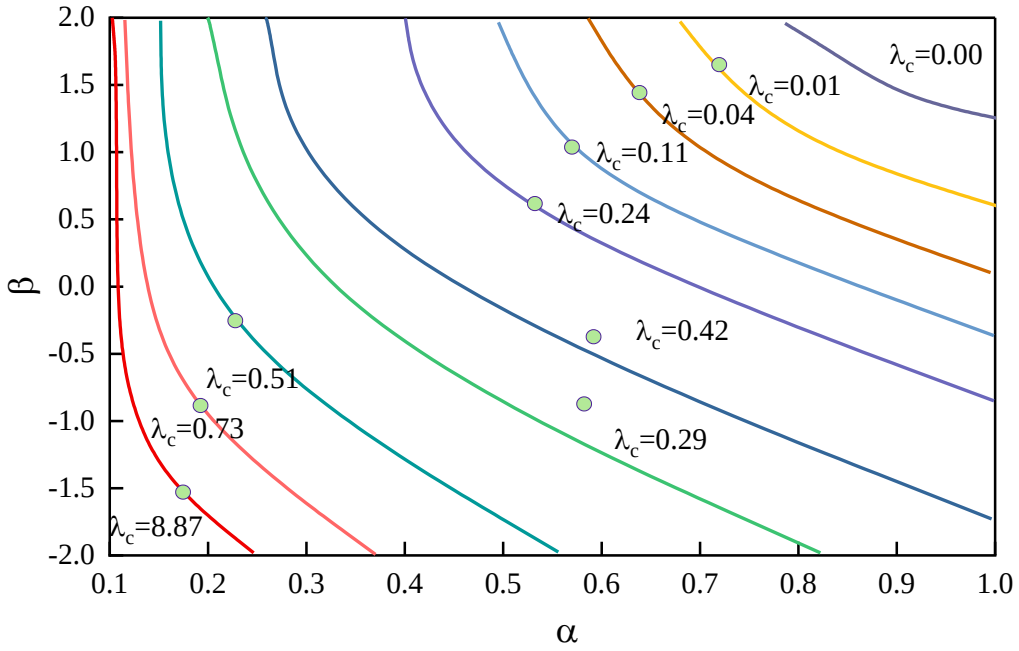

Figure 5 Propagation of the relationship between critical values and parameters

Operational Value Analysis

If the traditional art cannot be renewed and inherited through its own form, it is necessary to optimize and improve the communication method on the basis of retaining the core content, so as to promote it with the help of a new communication recommendation model. Diversified music vision can provide personalized resources and information, which can not only become the communication channel of the opera, but also highlight the core attraction of the opera, cater to the interest tendency of young people, expand the young audience, and provide assistance for the development of the opera. The results of the analysis of the operational value of the Chinese epic opera "Long March" are shown in Table 1.

The value of T-statistic is 0.722, and the corresponding probability Sig value is equal to 0. In the test value of spreading Chinese theater art, we can also see that the observed value of T-statistic is 0.494, and the corresponding probability Sig value is approximated to 0.001, and in the test value of promoting Chinese traditional culture, we can also see that the observed value of T-statistic is 1.011, and the corresponding probability Sig value is approximated to 0. Finally, in the test value for the penetration of creativity in opera, we can also see that the observed value of the T-statistic is 0.797, and the corresponding probability Sig value is approximated to 0.001, which shows that the results of the four tests are at the 0.05 level of significance. It means that all the samples in this experiment are significantly different, indicating that the value of the communication operation of the Chinese epic opera "Long March" is positively changed under the perspective of diversified music. The results of the regression test can prove that the promotion and dissemination of the Chinese epic opera "Long March" under the diversified music perspective is in line with the actual promotion and dissemination of Chinese opera art. We should increase the publicity and promotion of diversified operas, create classic opera works that can move the audience, and then set off the trend of the whole nation appreciating the opera, so as to provide an effective guarantee for the promotion and dissemination of Chinese opera art.

Table 1 Operational value regression analysis

		T	DF	Sig
Operational value of The Long March	Assuming equal variance	0.722	101.11	0.000
	Assuming unequal variances	0.715	72.606	0.000
		T	DF	Sig
Dissemination of Chinese Opera Art	Assuming equal variance	0.494	101.11	0.001
	Assuming unequal variances	0.477	75.525	0.002
		T	DF	Sig
Promotion of traditional Chinese culture	Assuming equal variance	1.011	101.11	0.000
	Assuming unequal variances	1.110	70.311	0.000
		T	DF	Sig
Opera creativity permeates	Assuming equal variance	0.797	101.11	0.001
	Assuming unequal variances	0.777	67.542	0.001

Discussion

Further research could introduce sentiment analysis techniques to gain insight into the audience's emotional response to the content and performance of the opera. In addition, attention can be paid to user engagement in the communication process, such as comments, sharing and discussions, so as to assess its impact on communication effects. Or by combining the diverse musical perspectives with China's specific cultural context, the value of opera in cultural exchange and cross-border communication can be explored. Examining the cross-influence with other cultural fields, such as literature and art. As well as quantitatively assessing the impact of The Long March opera in terms of social significance and historical education.

This includes quantifying the opera's role in shaping social perceptions and emotions through analysis of audience feedback and social reactions. Establish a long-term monitoring mechanism to continuously assess the communication effect and operational value of the Long March opera, and timely adjust the communication strategy and operation mode to adapt to the changing cultural and market environment. Digging deeper into the corporate communication and operational value of the Chinese epic opera "The Long March" under the diversified music perspective, to provide a more in-depth understanding for better promoting its communication and cognition.

Conclusion

In this paper, through the training of multiple neural network layers of convolutional neural network, based on the SIR model, the influence of reflecting the propagation behavior on the difference of node strength and edge power is introduced to obtain the corporate propagation dynamics model under the diversified music perspective, and the corporate propagation critical value of the Chinese epic opera The Long March is deduced. The results show that any unilateral change of parameter values will lead to a great fluctuation of the corporate propagation critical value of The Long March. When α increases from 0 to 1, the critical value of propagation becomes smaller and smaller, and when β increases from -2 to 2, the critical value of corporate propagation of the Chinese epic opera The Long March decreases rapidly, and then decreases more and more slowly. And by analyzing the results of the operational value of the Chinese epic opera The Long March, all the four test results are at the 0.05 significant level, which proves that the promotion and dissemination of the Chinese epic opera The Long March under the diversified music perspective is in line with the actual promotion and dissemination of the Chinese opera art.

Although this study provides an in-depth analysis of the value of corporate communication and operations of the Chinese epic opera The Long March in the context of diversified musical perspectives, the value of corporate communication and operations is affected by a multitude of external factors, including market trends, cultural contexts, and social events. These factors may not have been fully considered in the study, limiting the interpretation of the results. The Long March, as a Chinese epic opera, has a unique cultural and historical context. There may be limitations in the applicability of the findings to other types of operas or cultural contexts.

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