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Retraction

Retracted: Analysis on the Evolution of Ecological Transformation of Consumption Patterns to Help Realize the Evolution of Realize Low-Carbon City Construction Taking into Account Similarity Knowledge Recognition and Matching Algorithms

Mathematical Problems in Engineering

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This article has been retracted by Hindawi following an investigation undertaken by the publisher [1].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] X. Li, L. Tao, and X. Zhou, "Analysis on the Evolution of Ecological Transformation of Consumption Patterns to Help Realize the Evolution of Realize Low-Carbon City Construction Taking into Account Similarity Knowledge Recognition and Matching Algorithms," *Mathematical Problems in Engineering*, vol. 2022, Article ID 9914086, 10 pages, 2022.

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Research Article

Analysis on the Evolution of Ecological Transformation of Consumption Patterns to Help Realize the Evolution of Realize Low-Carbon City Construction Taking into Account Similarity Knowledge Recognition and Matching Algorithms

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For the purpose of addressing or eliminating the influence of low-carbon city construction effectively, it is crucial to carry out qualitative analysis on the evolutionary process in the construction of the low-carbon city based on the similarity knowledge identification matching algorithm. The ecological transformation of consumption patterns is implemented to facilitate the distribution of resources in the evolution analysis of the low-carbon city construction. The regularity and innovation during the process of building low-carbon cities is effectively summarized. On the premises of fully grasping the principles of low-carbon city development and related policy protection, a suitable low-carbon city development model is found. In accordance with the features of separate transmission, the model is recovered by using the characteristics in the total deviation observed, and the constrained nonoptimizable case is replaced with the computation case of constrained separate line segment with the relaxation factor. Finally, the results of the practical case analysis suggest that the image processing method supported by the ecological transformation of consumption patterns applied in this paper uses the relatively advanced computer network technology and 3D visualization model construction based on the establishment of a low-carbon city construction model according to the effective analysis of geological surveys and data, which can provide theoretical support for the subsequent construction of low-carbon cities.

1. Introduction

With the construction of low-carbon cities as the foundation for the ecological civilization construction, real-time, rationalized, and accurate monitoring is implemented on the construction of low-carbon cities. It can also provide a theoretical basis for the decision making of the relevant testing and inspection authorities on environmental protection, which is of important significance for the continuous emergence of a large number of ecological transformation projects with the consumption patterns [1, 2]. The detailed analysis of the ecological transformation of consumption patterns is carried out to explore the problems and defects in the process of low-carbon city construction, so as to formulate training and improvement plans in the later period. In the analysis process on the evolution of low-carbon city construction in the ecological transformation of traditional consumption patterns [3, 4], low-carbon city construction and real-time risk alerts are also valid data in the acquisition and analysis process by low-carbon city construction equipment. The data on the relevant indexes are acquired from low-carbon city construction, and the feedback is given accordingly. Based on the data obtained, the performance of low-carbon city construction is analyzed to investigate the operational status of low-carbon city construction and diagnose the root cause of failure. In addition, it can also be used to monitor the root cause of failure. Low-carbon city construction and real-time risk alerts are essential manifestations of the management and systematization integration in the construction of low-carbon cities, which have provided specific data information for the operation and maintenance of low-carbon city construction, performance analysis of low-carbon city construction, monitoring of abnormalities, monitoring of the link status, capacity planning, and so on, exerting a crucial role in the whole the process. With the construction of low-carbon cities as the focus of the studies in this field at present, it can be perfectly combined with different industry sectors to achieve the full and effective application of different industry data in the practical construction environment for low-carbon cities. In accordance with the construction concept of ecological priority and green development, the construction of multisource data monitoring and fusion capacity is fully utilized to establish an information service platform for remote sensing monitoring of the environment based on the similarity knowledge recognition and matching algorithm. For the purpose of extending the utilization cycle of low-carbon city construction as much as possible and lowering the poor packet loss and time delay in the transmission of data information on the low-carbon city construction, it is necessary to optimize the scheme for the low-carbon city construction. This paper analyzes the real-time evolution of the targets in the construction of low-carbon cities with similarity knowledge identification matching algorithm. Finally, the analysis of the experimental results shows that this article compares the specific practices of other low-carbon city construction, deeply analyzes their commonalities and characteristics, explores suitable paths for China's low-carbon city construction, and provides solutions and theoretical basis for Chinese low-carbon city construction.

2. Methods

2.1. Principle of Knowledge Recognition and Matching Algorithm of Content Similarity. In the process of knowledge recognition and matching because it needs to be fully matched and expanded according to the needs of users, traditional collaborative filtering algorithms alone cannot meet users' matching needs for content similarity. This paper proposes a knowledge recognition and matching algorithm. This algorithm can be used to match and identify related knowledge based on content similarity. The detailed basic principles are as follows: according to the user's hobbies, a content similarity model, determine the knowledge recognition and matching method, and make the user-knowledge item evaluation matrix items not zero. This solves the sparsity problem in collaborative filtering [4]. Next, based on the knowledge of the collaborative filtering algorithm, the synergy matrix is executed as the new user's knowledge item score matrix. Figure 1 shows the structure diagram of the knowledge recognition matching algorithm based on content similarity.

According to the above analysis principle, the knowledge recognition and matching algorithm based on content similarity.

Step 1. Construct user-knowledge item evaluation matrix.

The user-knowledge evaluation is represented by a matrix $C_{a\times b}$, m stands for the specific number of users in the low-carbon city, and n stands for the knowledge item in the algorithm applied, in which the variable parameters of the jth column and ith row is $P_{i,j}$. Thus, the analysis term for the evolution of user i to the knowledge term j in the low-carbon city can be calculated accordingly. If $0 < P_{i,j} \leq 5$ is satisfied, then it means that the evaluation is closer to 0, which means that the user is not interested in this knowledge item; if the value of the evaluation is close to 5, it means that the user has a very high knowledge item, and 0 means that the user has not evaluated this knowledge item [5]. The corresponding evaluation matrix of user-knowledge item is shown in expression (1):

$$C_{a\times b} = \begin{bmatrix} P_{1,1} & P_{1,2} & \cdots & P_{1,b} \\ P_{2,1} & P_{2,2} & \cdots & P_{2,b} \\ \vdots & \vdots & \vdots & \\ P_{a,1} & P_{a,2} & \cdots & P_{a,b} \end{bmatrix}. \quad (1)$$

Step 2. Construct the similarity matrix.

First of all, the user's knowledge needs are expressed as an appropriate user interest model, and the most general form of expression is the user interest vector. Then, the knowledge items to be processed are expressed as vectors of the same dimension. Calculating the user's knowledge requires the similarity between the vector and the vector of each knowledge item. In order to better express the user's interest and reduce the computational complexity, the feature model of the knowledge item and the user's interest model are represented by the space vector method. The space vector representation method can not only contain the data information that the user is interested in in detail but also can construct a vector model with this keyword and complete the weight value of each vector model according to the user's interest. Combined with content-knowledge items, based on the process of low-carbon city construction, similar knowledge can be roughly divided into two types, that is, text-based knowledge and nontext-based knowledge. Among them, for text knowledge items, the TF-IDF algorithm can be used to calculate the weight value. For nontext knowledge items, the weight can be calculated by using the error value between the knowledge attribute and the user attribute [6, 7].

For nondocument knowledge items, the calculation of the attribute t_m weight of the knowledge item j is shown in formula (2).

$$w_{jm} = \begin{cases} 1, \text{Knowledgeitem}\, j \text{hasattributet}_m, \\ 0, \text{Knowledgeitem}\, j \text{hasnoattributet}_m. \end{cases} \quad (2)$$

Regarding items with knowledge attributes, the user's interest does not count as absolute positive or negative. Usually, it can also indicate any value between [0, 1] according to the degree of interest. The item. Weight calculation formula of user i for the content feature item t_m is as follows:

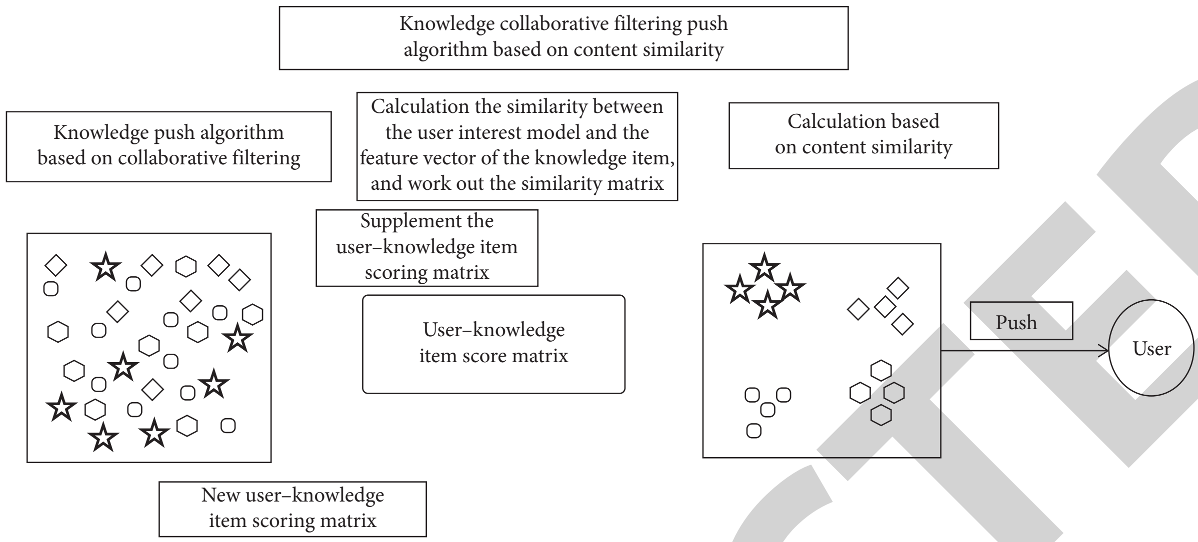

FIGURE 1: Principle of knowledge recognition and matching algorithm based on content similarity.

$$w_{im} = \frac{r(t_m)/a}{r(u_i)/b}. \quad (3)$$

Among them, w_{im} is used to indicate the degree of user i's preference for the attribute feature t_m of the knowledge item, which is the so-called weight value. If the calculated value is closer to 1, it means that the secondary user has a higher degree of preference for the attribute feature t_m; $r(t_m)$ represents the sum of the evaluation of the attribute feature t_m under the evaluation of user i; $r(u_i)$ represents the sum of all evaluation scores of user i; and a and b in turn represent the number of items evaluated for corresponding knowledge items.

Based on the space vector notation adopted, it can be expressed as $U_i = \{(t_1, w_{i1}), (t_2, w_{i2}), \ldots, (t_m, w_{im})\}$ according to the ith user's actual preferences, and the feature vector of knowledge item j can be expressed as $U_i = \{(t_1, w_{i1}), (t_2, w_{i2}), \ldots, (t_m, w_{im})\}$, in which t represents the attribute feature in the knowledge item, and w represents weight value in construction of the model with feature item. By calculating the cosine value of the user i's user interest feature vector U_i and the knowledge item j feature vector V_j, the similarity $\mathrm{sim}(U_i, V_j)$ between the two can be calculated, which can be used for the user's number of new assessments toward knowledge item. The calculation formula of similarity is as follows:

$$\mathrm{sim}(U_i, V_j) = \cos(U_i, V_j) = \frac{U_i V_j}{|U_i||V_j|} = \frac{\sum_{k=1}^{m}(w_{ik} w_{jk})}{\sqrt{\sum_{k=1}^{m} w_{ik}^2}\sqrt{\sum_{k=1}^{m} w_{jk}^2}}. \quad (4)$$

Process the similarity so that the similarity is consistent with the score on the numerical level, namely:

$$\mathrm{sim}'(U_i, V_j) = 5 \times \mathrm{sim}(U_i, V_j). \quad (5)$$

According to the calculated similarity, the structure similarity matrix $B_{m\times n}$ is shown in formula (6).

$$B_{m\times n} = \begin{bmatrix} \mathrm{sim}'(U_1, V_1) & \mathrm{sim}'(U_1, V_2) & \cdots & \mathrm{sim}'(U_1, V_n) \\ \mathrm{sim}'(U_2, V_1) & \mathrm{sim}'(U_2, V_2) & \cdots & \mathrm{sim}'(U_2, V_n) \\ \vdots & \vdots & \vdots & \\ \mathrm{sim}'(U_m, V_1) & \mathrm{sim}'(U_m, V_2) & \cdots & \mathrm{sim}'(U_m, V_n) \end{bmatrix}. \quad (6)$$

Step 3. Construct a new user-knowledge item evaluation matrix.

According to the evaluation matrix and similarity matrix obtained above, the zero value that was not evaluated in the original user-knowledge item evaluation matrix can be replaced, and it can be converted to the value in the corresponding similarity matrix, and then the new user-knowledge item evaluation matrix is obtained, Assuming that $P_{i,j}'$ is used to represent the value of the new matrix evaluation, the principle is shown in Figure 2.

$$P_{i,j}' = \begin{cases} P_{i,j}, & P_{i,j} \neq 0, \\ \mathrm{sim}'(U_i, V_j), & P_{i,j} = 0, \end{cases} \quad i = (1, 2, \ldots, m), \quad j = (1, 2, \ldots, n). \quad (7)$$

Therefore, the new user-knowledge item evaluation matrix $D_{m\times n}$ is expressed as shown in formula (8).

$$D_{a\times b} = \begin{bmatrix} P_{1,1}' & P_{1,2}' & \cdots & P_{1,b}' \\ P_{2,1}' & P_{2,2}' & \cdots & P_{2,b}' \\ \vdots & \vdots & \vdots & \\ P_{a,1}' & P_{a,2}' & \cdots & P_{a,b}' \end{bmatrix}. \quad (8)$$

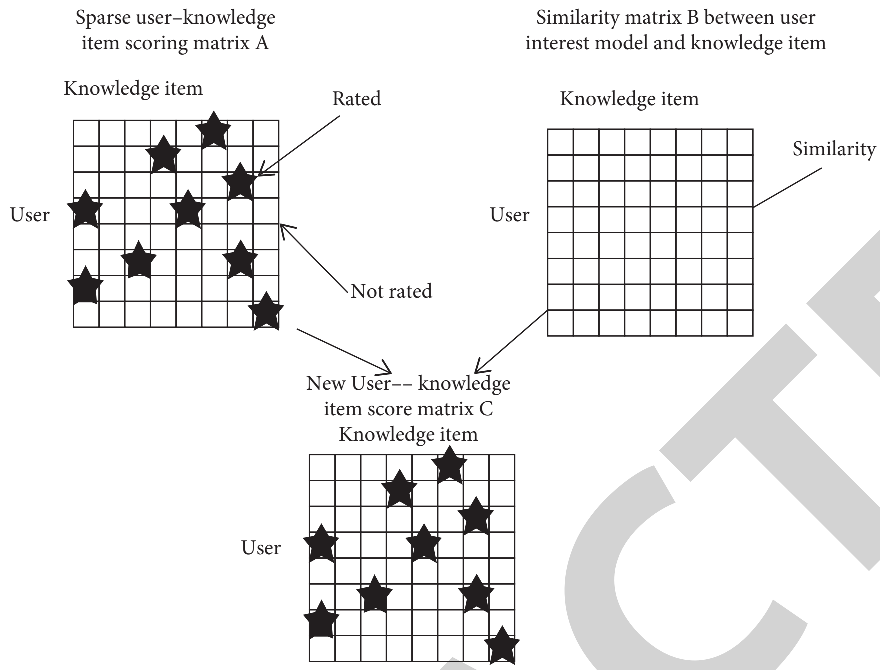

Figure 2: Shows the principle of forming the new user-knowledge item score matrix.

Step 4. Retrieve nearby neighbor evaluation items.

Searching for the best neighbor is the core content of the algorithm cited in this article. The efficiency and effect of this process also affect the efficiency and effect of the push algorithm to a certain extent. The closest optimal neighbor mainly refers to the relatively close to the user group in comparison with the users of the current evaluation operation. The closest optimal neighbor is actually a process of constructing a model in the similarity knowledge recognition and matching algorithm, that is, the new users-knowledge items evaluation matrix $D_{m\times n}$ is used. The degree of content similarity between user i and user j can be expressed by using the similarity degree algorithm. In this paper, it is expressed by using sim (i, j). After the likelihood assessment has been completed, it can be represented by using the set I_{ij} of knowledge terms. Thus, the calculation of the Pearson correlation coefficient can be described as the following:

$$\mathrm{sim}\,(i, j) = \frac{\sum_{c\in I_{ij}}\left(P_{i,c}{}' - \overline{P_i'}\right)\left(P_{j,c}{}' - \overline{P_j'}\right)}{\sqrt{\sum_{c\in I_{ij}}\left(P_{i,c}{}' - \overline{P_i'}\right)^2}\sqrt{\sum_{c\in I_{ij}}\left(P_{j,c}{}' - \overline{P_j'}\right)^2}}. \quad (9)$$

Among them, $P_{i,c}{}'$ is used to represent the evaluation value of user i on the knowledge item c in the new user-knowledge item evaluation matrix, $P_{j,c}{}'$ is used to represent the evaluation value of user j on the knowledge item c in the new user-knowledge item evaluation matrix, and $\overline{P_i'}$ and $\overline{P_j'}$ indicate the average evaluation values of user i and user j in turn.

Step 5. Push the user's content similarity.

The degree of similarity that can be calculated can accurately find the similar optimal neighbors of the target user and complete the push of their knowledge. Assuming that the nearest neighbor set of user u is represented by NN_u, then the evaluation value of the knowledge item i by user u, $Q_{u,i}$ can be used to borrow the evaluation and calculation process of the knowledge item in the nearest neighbor set NN_u of user u as follows:

$$Q_{u,i} = \overline{P_u'} + \frac{\sum_{n\in NN_u}\mathrm{sim}\,(u, n) \times \left(P_{n,i}{}' - \overline{P_n'}\right)}{\sum_{n\in NN_u}\left(|\mathrm{sim}\,(u, n)|\right)}. \quad (10)$$

2.2. The Eco-Transformation of Consumption Patterns to Build a Low-Carbon City. Real-time Data Update Algorithm, when constructing an analysis model for the evolution of the eco-transformation goals of consumption patterns, the graphics of the low-carbon city construction goals need to be tested. There are relatively many low-carbon city construction analysis methods currently in use, but compared with other algorithms, the real-time data update algorithm requires less calculation. Therefore, the accuracy and speed of evolution analysis are more suitable for the evolution analysis of the ecological transformation of consumption patterns. According to the characteristics of the ecological transformation of the consumption patterns, a low-carbon city construction evolution analysis method based on the low-carbon city construction evolution analysis platform is put forward in this paper. The evolution analysis is carried out based on the threshold values at the nodes of ecological transformation of the consumption patterns to help implement the evolution analysis of the low-carbon city construction. In addition, it is necessary to perform balanced processing at all the links in the low-carbon city construction, and the evolution analysis capacity for low-carbon city construction can be effectively improved by using the low-carbon city construction evolution analysis platform for the ecological transformation of consumption patterns to facilitate the evolution analysis of low-carbon city construction.

It is assumed that in the analysis on the evolution of low-carbon city construction, a total of K sets of sparse analysis are initiated. Then, the high performance operation in the ecological transformation of the consumption patterns in the $k\,(k = 1, 2, \ldots, K)$ set can be expressed as the following:

$$s_1(t) = \sum_{m=0}^{M-1} \operatorname{rect}\left(\frac{t - mT_R - kMT_R}{T_p}\right) \cdot \exp\left(j\pi\gamma\left(t - mT_R - kMT_R\right)^2\right) \cdot \ \exp\left(j2\pi f_{sm}\left(t - mT_R - kMT_R\right)\right). \tag{11}$$

In the above equation, $t = \hat{t} + mT_R + kMT_R$, $(m = 1, 2, \ldots, M)$ stands for the whole computation time, $\hat{t}$ stands for the fast time, and $\operatorname{tect}(u)$ stands for the corresponding rectangular window.

In the case where the evolution analysis of the low-carbon city construction contains more than one feature point, the coefficient of the backward feature at the $p\,(p = 1, 2, \ldots, P)$ feature point can be represented by σ_p. If the corresponding time delay value $\tau_p(t)$ for the feature point p within the transformation booster in the evolution analysis of the low-carbon city construction is not changed, then $\tau_p(t) \approx \tau_p(t_{m,k}), t_{m,k} = mT_R + kNT_R$ is established. At the same time, with regard to the feature points in the evolution analysis of the low-carbon city construction, the mth sub-transformation booster in the high-performance operation of the kth set with the consumption pattern ecological transformation booster can be expressed as the following:

$$s_2(\hat{t}, m, k) = \sigma_p \operatorname{rect}\left(\frac{\hat{t} - \tau_p\left(t_{m,k}\right)}{T_P}\right) \cdot \ \exp\left(j\pi\gamma\left(\hat{t} - \tau_p\left(t_{m,k}\right)\right)^2\right) \cdot \exp\left(j2\pi f_{sm}\left(\hat{t} - \tau_p\left(t_{m,k}\right)\right)\right) + \varepsilon(\hat{t}). \tag{12}$$

In the above equation, $\tau_p(t_{m,k}) = 2R_P(t_{m,k})/c$ stands for the instantaneous slope distance between the pth feature point and the evolution analysis of the low-carbon city construction, c stands for the speed of light, and $\varepsilon(\hat{t})$ stands for the additive evolution. Thus, with regard to the transformation booster for resolving the line frequency tuning processing, it is assumed that $\hat{f} = \gamma(\hat{t} - 2R(t_{m,k})/c)$, then the evolution analysis process for the low-carbon city construction can be described as the following:

$$s_3(\hat{f}, m, k) = \sigma_p \operatorname{rect}\left(\frac{\hat{f}}{\Delta f}\right) \exp\left(j\frac{4\pi}{c}\left(f_{sm} + \hat{f}\right)\Delta R\right) \exp\left(j\frac{4\pi}{c}\left(\Phi_P + \Phi_B\right)\right) + \varepsilon(\hat{f}). \tag{13}$$

In the above equation, $\Delta R = x_p \sin\theta_{m,k} + y_p$ and Φ_P, Φ_B stand for the phase error due to the flat motion between transformation boosts and the phase error due to the flat motion between transformation boost strings for the evolution analysis of the low-carbon city construction, respectively.

The remaining transmission process parameters $(\Delta v_R, \Delta a_R)$ for the evolution analysis of the low-carbon city construction are introduced to the database, and the sparse observation model for the evolution analysis of the low-carbon city construction can be expressed as the following:

$$s_k = D_k(\Delta v_R, \Delta a_R)\theta_k + n. \tag{14}$$

In the above equation, $D_k(\Delta v_R, \Delta a_R) \in \mathbb{C}^{\overline{L} \times L}$ stands for the database matrix corresponding to the nth transition boost $L = N \cdot N_r$, $\theta_k \in \mathbb{C}^{L \times 1}$ stands for the HRRP corresponding to the kth transition boost, and n stands for the evolution vector.

N states that exist within the match are identified based on the similarity knowledge, which can be set to $S = \{S_1, S_2, \ldots, S_n\}$. Thus, the state at the moment t can be represented by q_t. The transfer matrices between different states can be expressed as $A = \{a_{ij}\}$, and the following expression can be obtained accordingly:

$$\alpha_{ij}(k) = P\left[q_{t+1} = S_j | q_t = S_i\right], 1 \le i, j \le N. \tag{15}$$

The similarity knowledge identification matching algorithm is different from the other methods in that the external value for each state is available only as an evolutionary analysis process, and the vector for the evolutionary analysis thus obtained is correlated with the state of the system. In addition, this relationship can be discrete or continuously distributed.

However, with regard to the observation of continuous distribution, the probability distribution of the evolutionary analysis vector corresponding to the state j can be obtained as the following:

$$b_j(v_t) = P\left[v_t | q_t = S_j\right], \quad 1 \le j \le N. \tag{16}$$

In general, the probability distribution is taken as a mixed Gaussian distribution, that is, it can be expressed as the following:

$$b_j(v_t) = \sum_{m=1}^{M} \omega_{j,m} N\left(o_t, \mu_{j,m}, \Sigma_{j,m}\right). \tag{17}$$

In the above equation, M stands for the number of mixed Gaussian distributions, ω_m stands for the positive mixed weights, while $N(o_t, \mu_{j,m}, \Sigma_j, m)$ is used to stand for the n-dimensional Gaussian distribution case.

$$\pi_i = P\left[q_1 = S_i\right], 1 \le i \le N. \tag{18}$$

Hence, the similarity knowledge recognition matching algorithm can be summarized into three groups $\lambda = (A, B, \pi)$. Thus, the observation sequence generated based on the recognition matching of similarity knowledge can be expressed as $O = o_1 o_2 \ldots o_T$, in which o_t stands for the vector that can evolve for analysis at the moment t, and T stands for the total length of the evolution analysis.

2.3. Construction of Low-carbon City Development Model. As an essential part of the design system proposed in this paper, the low-carbon city construction evaluation module can implement the effective evolution analysis of a natural disaster for an evaluation target through the evolution analysis, in which the similarity knowledge recognition matching algorithm is used to perform computation on the monitoring and evaluation map that can be generated accordingly. With the increasing varieties of evolutionary analysis targets, new evaluation targets for evolutionary analysis can be extended in this system to meet the practical demand of low-carbon city construction. The interaction of decision-making based on local government policies, corporate goals, and social mass in the process of ecological transformation of the consumption patterns is described in Figure 3 as the following.

Development Model, based on the analysis on the evolution of low-carbon city construction, the low-carbon city development model put forward in this paper can be expressed by using Figure 4 as the following.

This model mainly includes three dimensions: government-led, market regulated, and citizen participated to form a low-carbon city. The three dimensions do not exist in isolation, but a closed-loop system that influences and restricts each other.

3. Discussion

Analysis of the Advantages of Consumption Patterns in Urban Low-carbon Consumption: The consumption plan of China is a low-carbon model, in which the national health is placed in the first place, and the state is also paying more and more attention to the quality of national health. Academician Zhong Nanshan has called on everyone in the country to contribute to the construction in the low-carbon field. Based on the present context for the adoption of low-carbon model in the consumption in pursuit of health and thus the change to the traditional consumption model in our country at present, it is possible to guide the people to participate in the low-carbon construction and build a low-carbon construction atmosphere by using the power and influence of the Internet. The users of the low-carbon consumption form have changed accordingly from a single element form to a diversified form. The form of consumption at the training institutions in the market at present is taken as the research object to carry out the relevant analysis. These institutions have integrated the approach in the low-carbon consumption form with the enrollment for city construction training by previous enrollment means, using communication and friendly forms to promote the enrollment. In addition, they have launched promotional events for enrollment on a large scale so that more people in the country can be exposed to and understand the nature of these training institutions. This transformation has boosted the national enthusiasm and enhanced the engagement of people in the transformation of the consumption form, which has provided a sound context for the construction of healthy low-carbon cities in China. The application of the Internet and low-carbon consumption forms can make the lives of people more fun. In the past, fitness was carried out in an offline space; while in the low-carbon consumption form, not only can offline entertainment be provided, but it can also be combined with low-carbon environment to save more time for people. In this way, it can bring joy and health to people, while at the same time making communication faster, which has improved the happiness index, and provided an excellent foundation for the construction of low-carbon health in the city.

Applied Research on Mass Consumption Patterns in Low-carbon Cities: In the context that consumer forms are transforming in the direction of ecological protection on a global scale, the transformation has led to a new increase in the workload, which makes the existing business of firms during the ecological transformation of consumer forms more and more complicated. Among them, the most important business of the firms is the construction of low-carbon cities. With the ecological transformation of the consumer form in the construction materials market as the context for analysis, the tracking system is optimized accordingly, and positive data have been obtained by the tracking system after the optimization. The optimized tracking system has the advantages that it is a relatively small system, with a low cost, accurate positioning, timely and excellent connection, which allows the application of essential items for a long distance. In this paper, the development of urban construction in terms of the Internet is analyzed from three perspectives as the following: (1) by leveraging the advantages of the favorable conditions in the changes of the consumption patterns in the city and the construction projects with relatively high national engagement, more optimal configuration is set up so that people in favor of various forms of consumption can have a more efficient platform for the construction of low-carbon cities. (2) By analyzing and conducting research on the collected data and making full use of the development in the

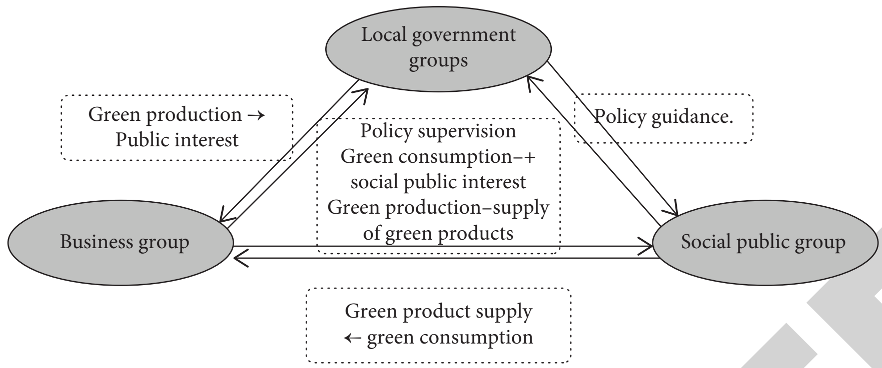

Figure 3: The main decision-making interaction of the eco-transformation of consumption patterns to build a low-carbon city.

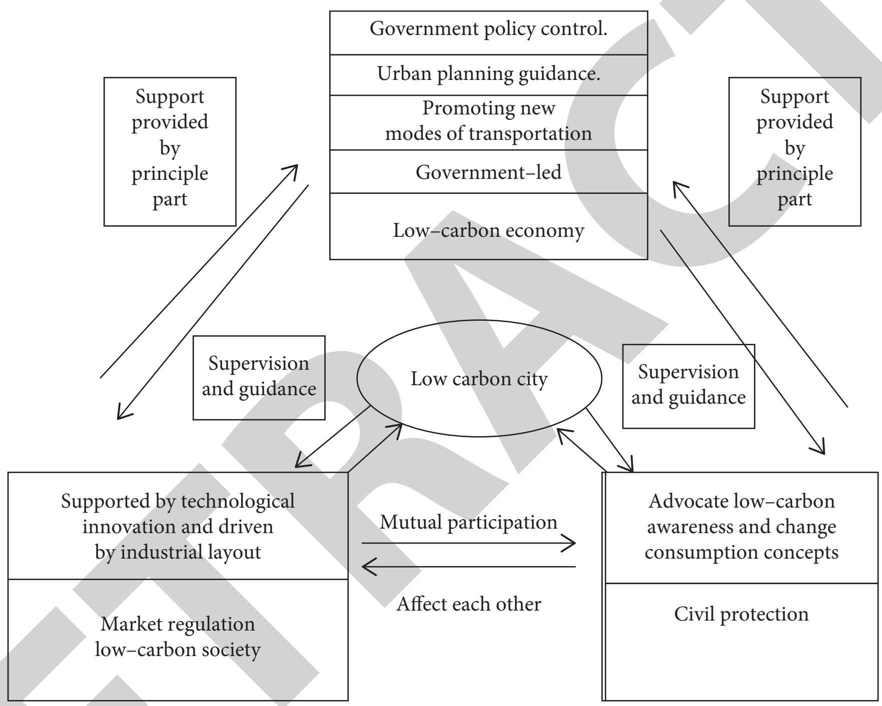

Figure 4: The general model of low-carbon city construction.

construction of low-carbon cities, the insight on the consumption trends of people in the city can be gained to provide a useful data basis for the urban construction. (3) Finally, through the sharing of resources, the present situation and key link in the urban construction are analyzed by using the low-carbon city consumption form to set up a low-carbon consumption form system for the urban construction through the Internet platform. In this way, the living environment and quality of life can be improved for the people in the city, which can lay a healthy foundation for the development of the consumption system in urban construction [8–13].

4. Analysis of Examples and Results

The evaluation system for low-carbon city construction based on similarity knowledge identification and matching algorithm in combination with the evaluation analysis model for low-carbon city construction is used in this paper to assess the construction of low-carbon cities based on the principles of standardization, normalization, as well as scientificization. Therefore, in the process of low-carbon city construction, it is necessary to formulate a complete timetable and goals for each stage, as shown in Figure 5, stipulating an annual summary, review, and revised system [14].

In the first stage, important low-carbon construction elements are identified. Only by correctly identifying the important factors of urban low-carbon construction, can we build a low-carbon city better. First, we must decompose the strategic objectives. Improving ecological performance is the fundamental goal of low-carbon city construction, taking this as a strategic mission to decompose low-carbon goals and rebuild the industrial system. Formulate corresponding planning strategies in the reconstruction of urban space and the transformation of consumption patterns. The relevant index system is established as a control method for the

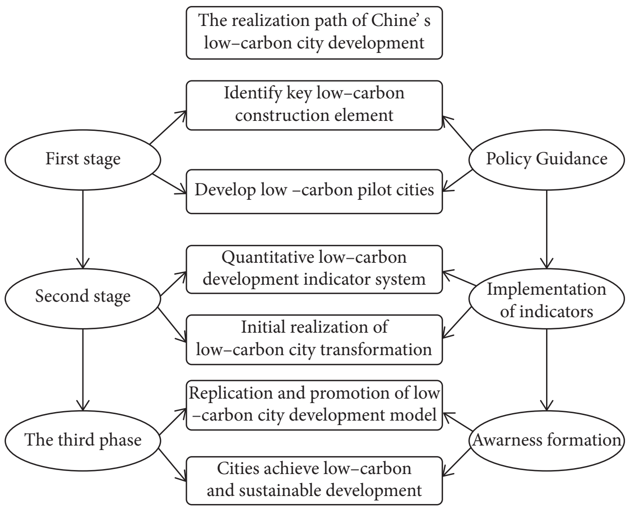

Figure 5: The realization path of China's urban low-carbon development.

implementation of the plan, which provides classified guidance for cities with different economic development levels and resources and environments. Second, the construction of demonstration cities is particularly important in the exploratory stage for domestic cities that cannot be referenced by established models in the exploration stage. Through the establishment of a low-carbon eco-city theory and practice exchange platform, the promotion of various model projects such as green transportation, green municipal administration, and green buildings will realize a diversified, replicated, and popular low-carbon city development system.

In the second stage, quantify and standardize low-carbon construction indexes. Low-carbon city construction is a complex comprehensive system based on system theory, including social coordination, resource conservation, sustainable development, and other aspects and dimensions. The quantification of low-carbon city construction indexes is helpful to the measurement and supervision of the entire city construction process and helps to announce low-carbon city construction policies. The overall planning and management decision-making provide data support, which helps to compare the horizontal and vertical comparison of the development process between cities. For example, for the currently newly established low-carbon eco-city, China has set 6 near-, mid-, and long-term thresholds, including that renewable energy accounts for more than 20% of all energy use. About 80% of buildings meet China's green building standards. Biodiversity is promoted, to realize green transportation, set industrial thresholds, and reject industrial projects with high energy consumption and high emissions.

In the third stage, the concept of consciousness promotes the development of low-carbon cities. Orientated at the effective realization of the goal of reducing carbon emissions, the successful model of low-carbon city development has been popularized and applied throughout society. Public awareness is aroused, they actively practice in the sustainable development of cities, extensively carry out bilateral or

Table 1: The original users of the training group part of the evaluation matrix of the movie project.

User ID	Movie item									
	1	2	3	4	5	6	7	8	9	10
1	5	3	4	3	3	0	4	1	5	0
21	5	0	0	0	2	0	5	0	5	0
92	4	0	0	4	4	0	4	5	4	0
113	0	0	0	0	0	0	3	0	3	0

multilateral international cooperation such as international organizations, civil organizations, and support governments, public participation platforms and organizations, and local agencies actively cooperate and provide sufficient funds and technology. All aspects such as intelligent support, planning and design tools have been strongly integrated. Realize the fullness of low-carbon city construction.

Finally, because the research on low-carbon city construction models is still in the exploratory stage, this article specifically points out that urban planning should be integrated with other related energy laws to form a complete legal system as the basis for low-carbon city planning. In addition to administrative means, urban planning must also use legal means to take coercive measures in certain areas. Meanwhile, due to the large number of cities in China and their different characteristics, the design of urban development models and management systems must be combined with the current situation of the local system, economy, culture, and history. This requires local governments to consider the location characteristics of the region when designing low-carbon city systems.

This article conducts quantitative experiments on the MovieLens Data Set open source data set provided by the MovieLens site. By analyzing and comparing the algorithm based on conventional content filtering, the algorithm based on conventional collaborative filtering and the improved algorithm proposed in this paper, the contrast curve graph is drawn, and the accuracy of the push is analyzed. In the experiment, the MovieLens Data Set database is first introduced, randomly select 66% of the data as the training set, and use the average absolute error method (MAE) to evaluate the accuracy of the algorithm. The smaller the MAE value, the higher the prediction accuracy of the inference algorithm. MAE is expressed in formula (19).

$$\text{MAE} = \frac{\sum_{i=1}^{N}\left|p_i - q_i\right|}{N}. \tag{19}$$

In the formula, $|p_i - q_i|$ is the difference between the predicted value and the actual value, and N is the number of movies pushed.

The specific experimental process and analysis are.

Step 1: Construct a user-video project evaluation matrix based on the known data of the training set. The user-movie project part evaluation matrix of the training group is shown in Table 1.

Step 2: In order to build a model that users are interested in, the preference value of each user in the

Table 2: The movie evaluation of ID = 376 users and the attribute distribution of the corresponding movie.

ID	Movie	Movie attribute																			Evaluation
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	
376	237	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	3
376	269	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	5
376	289	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	3
376	275	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	5
376	14	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	4
376	98	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	5
376	274	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	3
376	197	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	4
376	514	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	4
376	246	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	3
376	198	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	5
376	111	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	4
376	223	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	4
376	181	0	1	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0	4
376	11	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	4
376	268	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	3
376	328	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0	0	3

Table 3: Attribute preference values of ID = 376 users.

ID	Movie attribute										
	2	3	6	7	9	13	14	15	16	17	18
376	0.902	1.030	1.030	1.030	0.973	0.773	0.773	0.937	1.030	1.082	1.030

Table 4: The normalization of the attribute preference value of ID = 376 users.

ID	Movie attributes										
	2	3	6	7	9	13	14	15	16	17	18
376	0.834	0.952	0.952	0.952	0.899	0.714	0.714	0.866	0.952	1	0.952

Table 5: Partial similarity results between ID = 376 users and movies.

376	Movie item									
	1	2	3	4	5	6	7	8	9	10
$\text{sim}(U_i, V_j)$	0.287	0.839	0.330	0.809	0.859	0.297	0.582	0.297	0.297	0.582
$\text{sim}'(U_i, V_j)$	1.435	4.195	1.65	4.045	4.295	1.485	2.91	1.485	1.485	2.91

training group for each movie attribute is calculated. Taking ID = 376 as an example, Table 2 shows the user's movie evaluation and the attribute distribution of the corresponding movie. According to the data in Table 2, formula (3) is used to calculate the user's attribute preference value (the 0 item is not shown in the table), and the result is shown in Table 3. Then, the calculated preferred value is normalized, and the results are shown in Table 4.

Step 3: formulas (4) and (5) are used to calculate the similarity $\text{sim}(U_i, V_j)$ and $\text{sim}'(U_i, V_j)$ between the user and the movie item and construct a similarity matrix table. Some similarity results are shown in Table 5.

Step 4: The user-movie item evaluation matrix and similar matrices are used to construct a new user-movie item evaluation matrix, and expressions (9) and (10) are used to calculate the nearest neighbors, and to know the target user.

The accuracy of the algorithm proposed in this paper is verified by comparing the MAE changes of traditional content filtering and collaborative filtering algorithms. Figure 6 is a diagram showing a comparison of the average absolute error of a knowledge recognition and matching algorithm based on content similarity and a conventional algorithm.

Experimental results show that the knowledge recognition and matching algorithm based on content similarity are smaller than the traditional content filtering and collaborative filtering algorithms under the average absolute error, that is, the improved inference algorithm has higher accuracy.

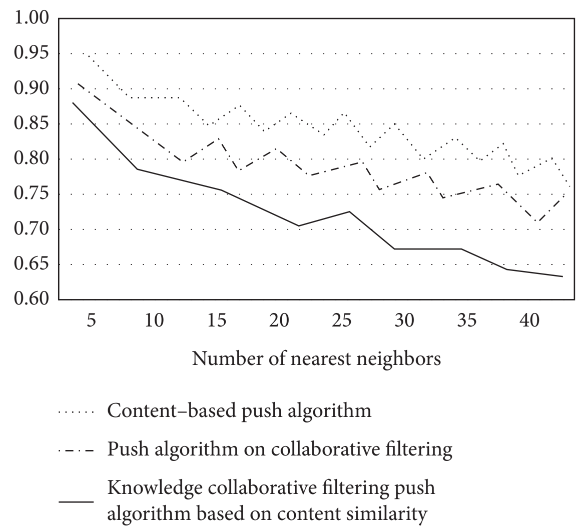

Figure 6: Comparison of the average absolute error between the knowledge recognition and matching algorithm based on content similarity and the traditional algorithm.

5. Conclusions

The mathematical model for low-carbon city construction established through the ecological transformation of consumption patterns is a finite-parameter linear model to facilitate image processing. On the basis of complying with the finite-parameter linear model, it can be used to optimize the system in accordance with the steady state in the construction of low-carbon cities. During the analysis process on the dynamic evolution of low-carbon city construction, the issues in the evolution of low-carbon city construction can be analyzed based on the image processing algorithm supported by the consumption pattern ecological transformation. This method collects data and information for the goals of the ecological transformation of consumption patterns, fully considers the diversity of the ecological transformation of consumption patterns, conducts real-time evolution analysis of the ecological transformation goals of the upgraded consumption patterns, and analyzes the evolution of low-carbon city construction in the ecological transformation of consumption patterns recognize combining similarity knowledge recognize recognition and matching algorithms. Finally, through the experimental research, it can be observed that the evolutionary analysis process of low-carbon city construction based on the ecological transformation of consumption patterns is conducive to improving the processing and ensuring the completion of the evolution in turn based on the received data information. Through the elimination of the restrictive low-carbon environmental protection, it can guarantee that the optimal analysis results are obtained in the limited time period for evolution analysis.

Data Availability

The data used to support the findings of this study are available from the corresponding author upon request.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

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