Hindawi
Security and Communication Networks
Volume 2023, Article ID 9870958, 1 page
https://doi.org/10.1155/2023/9870958

Retraction

Retracted: Application of Fuzzy Analytic Hierarchy Process in the Quality Monitoring and Evaluation of College Teachers and the Construction of Index System

Security and Communication Networks

Received 26 December 2023; Accepted 26 December 2023; Published 29 December 2023

This article has been retracted by Hindawi, as publisher, following an investigation undertaken by the publisher [1]. This investigation has uncovered evidence of systematic manipulation of the publication and peer-review process. We cannot, therefore, vouch for the reliability or integrity of this article.

Please note that this notice is intended solely to alert readers that the peer-review process of this article has been compromised.

Wiley and Hindawi regret 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 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. Shi, "Application of Fuzzy Analytic Hierarchy Process in the Quality Monitoring and Evaluation of College Teachers and the Construction of Index System," *Security and Communication Networks*, vol. 2022, Article ID 5124433, 11 pages, 2022.

Hindawi
Security and Communication Networks
Volume 2022, Article ID 5124433, 11 pages
https://doi.org/10.1155/2022/5124433

Research Article

Application of Fuzzy Analytic Hierarchy Process in the Quality Monitoring and Evaluation of College Teachers and the Construction of Index System

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Received 7 June 2022; Revised 12 July 2022; Accepted 19 July 2022; Published 18 August 2022

Academic Editor: Hangjun Che

In view of the relevant problems existing in the faculty of colleges and universities, in order to further analyze the deficiencies existing in the quality monitoring and index system of the faculty of colleges and universities. Based on the method and theory of fuzzy analytic hierarchy process, this study evaluates the quality monitoring results of university teachers, and researches the establishment of the index system of university teachers. The results show that k of different parameters increases slowly at first and then tends to be stable with the increase of iteration time. However, different parameters show different variation relations at higher iteration time. When k is 15, it can be used for targeted analysis of model index CR_1. It can be seen from the weight analysis chart of quality monitoring of college teachers that the highest proportion is work pressure, while the lowest proportion is working environment. The research shows that the work pressure has the greatest influence on the quality monitoring analysis of college teachers. The construction diagram of the index system of college teachers shows that the fuzzy analytic hierarchy process can better reflect the quality system and index system of college teachers. Relevant research results can provide theoretical support for the application of fuzzy analytic hierarchy process in the research of college teachers.

1. Introduction

Fuzzy analytic hierarchy process has been widely used in different fields. In terms of transportation, aiming at the problems existing in safety and reliability of roads and bridges, a new optimization model based on fuzzy analytic hierarchy process theory was proposed in [1]. The model obtains the operation data of different vehicles by using the method of hierarchical analysis, and then imports the corresponding data into the target module. Through further iterative calculation of the target module, the relevant indexes and corresponding factors that quantitatively describe the bridge safety were obtained. Through the analysis of different factors to find out the most important factors, which were imported into the model function, so as to evaluate the safety of the model related indicators. The optimization model can carry out targeted analysis on expressways and other vehicles. In order to verify the accuracy of the model, a local vehicle was used for verification. The final results show that the optimization model based on analytic hierarchy theory can accurately characterize the safety and reliability of traffic transportation. In view of the relevant problems existing in the construction of the Internet, as well as for the targeted evaluation and analysis of the Internet, an atomization method based on the theory of fuzzy analytic hierarchy process was proposed in [2]. The method firstly iteratively analyzes the evaluation data of the Internet, and then obtains the optimized corresponding parameters, and then imports the data into the fuzzy hierarchy analysis function. This function can not only analyze the data, but also predict and study the computing rules of the Internet through the change trend of the data. The research shows that the Internet atomization calculation method based on fuzzy analytic hierarchy process model can provide theoretical support for Internet decision-making and operation, so as to make targeted evaluation for the development of the Internet. Finally, the model was verified by Internet data, and the atomization method and function

of fuzzy analytic hierarchy process after model optimization were obtained. Fuzzy analytic hierarchy process is not only widely used in traffic computation and Internet, but also in engineering. In view of the relevant safety problems existing in coal mine engineering, a fuzzy analytic hierarchy process method was used to explore and evaluate the safety and stability of coal mine [3]. The model first divides coal mine safety into four different grades, which were based on the seismic conditions, geological causes, natural environment, and other factors of the coal mine. This grade was explored by considering the application prospect of engineering comprehensively. Based on the classification of the original model, targeted evaluation and research on coal mine safety of different grades can be divided into different grades according to different research content. And the different levels were interchangeable. Finally, the relevant database of coal mine safety was established, the evaluation data in the database was imported into the fuzzy analytic hierarchy process model for analysis, and the stability of coal mine safety was studied in combination with the evaluation grade. In order to verify the accuracy of the model, a coal mine in Iran was used to verify the safety and reliability of the model. In order to explore the application of fuzzy hierarchy analysis method in multi-function printer, the fuzzy hierarchy analysis model was firstly used to analyze the relevant functions of multi-function printer [4]. The corresponding discriminant index was obtained through analysis, and the discriminant index mainly includes printing speed, printing effect, and printing cost. Then, different discriminant indexes were brought into the fuzzy analytic hierarchy process function, so as to carry out the calculation of related evaluation indexes. As the data with evaluation indexes were imported into the optimization model, the iterative results can be used for optimization analysis of the fuzzy hierarchy analysis model. Finally, the indexes of the multi-functional printer can be analyzed and optimized, so that the optimized indexes can well explain the performance of the multi-functional printer. At last, 1000 samples were used to calculate the model to demonstrate the accuracy of the optimized model.

Based on the theory of fuzzy hierarchy analysis, this paper adopts the method of model analysis to study the faculty team in colleges and universities. This study mainly focuses on the analysis of quality monitoring and evaluation and index system construction of college teachers. The experimental curves and corresponding fitting parameters verify the accuracy of the model, and the relevant research results can provide a theoretical basis for the application of fuzzy analytic hierarchy process in college teachers.

2. Fuzzy Analytic Hierarchy Process

2.1. Related Theory of Analytic Hierarchy Process. Fuzzy analytic hierarchy process can be used to quantify the evaluation index, and the model can provide the basis for choosing the optimal scheme, so it has been widely used [5, 6]. The analytic hierarchy process is characterized by making use of less quantitative information to make the thinking process of decision-making mathematical on the basis of in-depth analysis of the nature, influencing factors and internal relations of complex decision-making problems. However, analytic hierarchy process has the following defects: (1) it is very difficult to test whether the judgment matrix is consistent, and there is a lack of certain scientific basis for the criterion to test whether the judgment matrix is consistent. (2) The consistency of judgment matrix is significantly different from the consistency of original computational thinking. (3) In fuzzy analytic hierarchy process, triangle fuzzy number cannot be used for quantitative analysis of pairwise comparison and judgment between different factors.

The basic principle of analytic hierarchy process is to list the expected purpose of solution according to the characteristics and related requirements of the actual events encountered in the actual operation. Then, according to the needs of the careful and detailed analysis of the possible related factors, analysis, comparison, research to carry out a hierarchical comparison of each factor, to establish the weight coefficient. Then, the important factor relative to the upper target layer is calculated. The principle of analytic hierarchy process is shown in Figure 1.

Through the system hierarchy analysis schematic diagram, we can see that the analytic hierarchy process can be mainly divided into four aspects, respectively, the target layer, the criterion layer, the sub-criterion layer, and the scheme layer. Different layers contain different subsets and content. The principle of analytic hierarchy process is as follows: firstly, relevant data are imported into the decision-making target module in the target layer, and the data are preliminarily analyzed and discriminated. The discriminant data is imported into the specific criterion module in the criterion layer. Different specific criterion modules correspond to different criterion areas, respectively. The data in the specific criteria area is imported into the sub-criteria module for further iteration update and analysis, and then different schemes are selected for calculation, and finally the obtained results are output.

The basic execution steps of analytic hierarchy process are as follows [7, 8]:

(1) clear objectives and construct hierarchical analysis model: through research and analysis of the expected objectives, clarify the relationship between the listed factors in the system events.

(2) Constructing judgment matrix: the core of analytic hierarchy process is to make quantitative comparison between different factors and determine the weight coefficient of factors of this layer to criteria of the next layer by comparison. The factors affecting the judgment and evaluation of college teachers, especially the analysis of quality monitoring and evaluation and the construction of index system, are also complex and changeable. Moreover, it is worth noting that many influencing factors can only be described by qualitative analysis method, which is difficult to be directly expressed by quantitative indicators. Therefore, for the evaluation and index system construction of quality monitoring of college

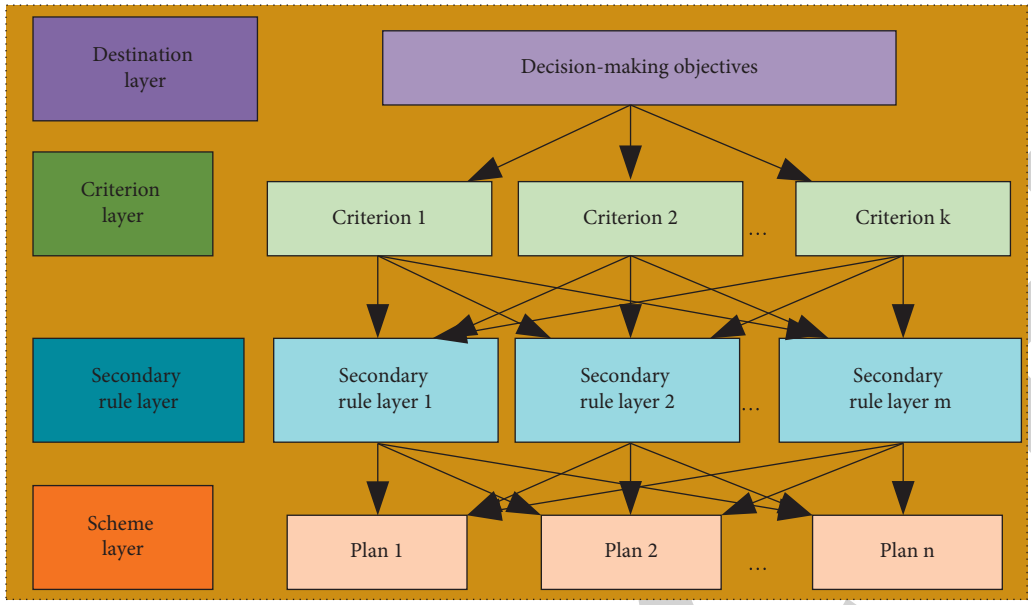

Figure 1: Schematic diagram of analytic hierarchy Process.

teachers, it is necessary to adopt a variety of different schemes for comparative analysis. Thus, the weight and influence of specific indicators can be determined more accurately. In order to determine the research content of the objective function more accurately, it is necessary to determine the judgment matrix M of the objective function first, as shown below.

$$M = \begin{bmatrix} a_{11} & \cdots & a_{1n} \\ \vdots & & \vdots \\ a_{n1} & \cdots & a_{nn} \end{bmatrix} = \begin{bmatrix} 1 & \cdots & w_1/w_n \\ \vdots & & \vdots \\ w_n/w_1 & \cdots & 1 \end{bmatrix}, \quad (1)$$

where, a_{ij} is the relative importance of the target, w_i is the weight of (i).

In order to analyze the calculation process of the judgment matrix more briefly, it is necessary to normalize the data of the judgment matrix, so as to obtain the weight coefficient w_i:

$$w_i = \frac{\overline{w}_i}{\sum_{i=1}^{n} \overline{w}_i}, \quad (2)$$

where, $\overline{w}_i$ is the average value of the weight.

(3) Consistency test of evaluation matrix: The purpose of consistency test of evaluation matrix is to judge whether the internal connection between the two factors is consistent. Generally speaking, if the judgment matrix A satisfies: $a_{ij} = a_{ik} \times a_{kj} \quad i, j, k = (1, 2, \ldots, n)$, then, the matrix A must be completely consistent, and the consistency test formula is as follows:

$$\sum_{i=2}^{n} \lambda_i = n - \lambda_{\max}, \quad (3)$$

where, n is the number of samples; $\sum_{i=2}^{n} \lambda_i$ is the cumulative value of linear parameters; λ_i is a linear parameter, and $\lambda_{\max}$ is the maximum value of the linear parameter. In this case, the judgment matrix is usually inconsistent. If the inconsistency is within the allowable deviation range, we can consider the matrix to be reasonable. However, if the judgment matrix exceeds the general allowable range, the availability of the calculated index weight will be reduced, which requires us to adjust the judgment matrix immediately and continuously until the consistency meets the allowable range.

The consistency verification test parameters are represented by *CI* and *CR*. The goal of *CI* index analysis is to study the relative analysis error between the analytic hierarchy process calculation results and corresponding test results. The objective of *CR* index analysis is to study the absolute analysis error between the analytic hierarchy process calculation results and corresponding test results.

$$\begin{aligned} \mathrm{CI} &= \frac{\lambda_{\max} - n}{n - 1}, \\ \mathrm{CR} &= \left| \frac{\mathrm{CI}}{\mathrm{RI}} \right|, \end{aligned} \quad (4)$$

where, *RI* is the index of average random consistency analysis. A large number of scientific studies have found that when $\mathrm{CR} < 0.10$, it meets the consistency requirement and meets our needs. When $\mathrm{CR} > 0.10$, it is necessary to analyze the factors, modify the comparison matrix, re-check the values of the elements of the judgment matrix, return to the first step, and constantly adjust the factor values until the consistency of the final results meets the requirements.

In order to better reflect the research errors of the judgment indicators *CI* and *CR* on the test data, the data change curves under two different judgment indicators are drawn, as shown in Figure 2.

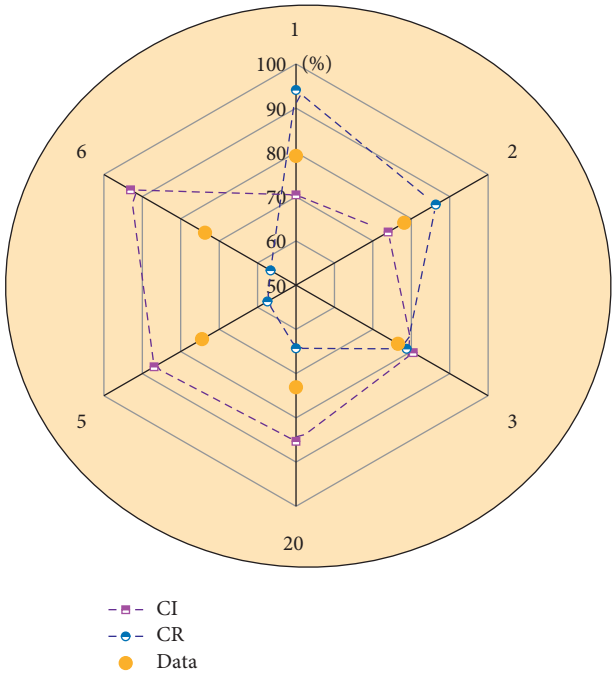

Figure 2: Change diagram of different judgment indexes.

It can be seen from the variation diagram of different indicators that the curve corresponding to *CI* judgment indicator shows a gradually increasing trend as the number of iterations increases. When the number of iterations is 1, the value of the judgment index of drinking is only 71%, while when the number of iterations increases to 6 times, the corresponding value is more than 90%. It indicates that the increase of iteration times can improve the proportion accuracy for judging index *CI*. The proportion of *CR*, the corresponding iteration index, shows a trend of gradual decline with the increase of the number of iterations. When the number of iterations is 1, the corresponding proportion data reaches 95%, while when the number of iterations is 6, it has decreased to below 60%. It indicates that the proportion accuracy of *CR* can be reduced with the increase of iteration times. The two different iterations have different trends, The corresponding test data shows a relatively stable trend of change, and the corresponding test data mainly concentrated in the range of 70% to 80%. It indicates that the data change of the experimental data is relatively small in the process of operation, and neither of the two iteration indexes can better reflect the change trend of the data. Therefore, it is necessary to comprehensively consider the influence of the two iterative indicators, and then, get an accurate iterative method to represent the data changes of the comprehensive quality of college teachers under analytic hierarchy Process.

2.1.1. Hierarchical Analysis of the Sequence and Data Consistency Test. After obtaining the relevant data of college teachers, the data are tested step by step from high level to low level so as to verify the consistency of the data. The corresponding sequence CR_1 can be calculated as follows:

$$\mathrm{CR}_1 = \frac{\sum_{j=1}^{m} a_j \mathrm{CI}_j^{(a)}}{\sum_{j=1}^{m} a_j \mathrm{RI}_j^{(a)}} = \frac{a^T \mathrm{CI}^{(a)}}{a^T \mathrm{RI}^{(a)}}, \tag{5}$$

where, a_j and a^T are the correlation coefficients of the calculation formula, and k is the influence parameter of the index. When $\mathrm{CR}^{(k)} < 0.1$, $k = 1,2, \ldots,$ p, unity is very satisfactory. When CR is greater than or equal to 0.10, we should reassign the judgment matrix and recalculate the process until the final result is consistent to our satisfaction.

Thus, the corresponding mutual recursive formula can be obtained:

$$\mathrm{CR}_1^{(k)} = \frac{\sum_{j=1}^{n_{k-1}} w_j^{(k-1)} \mathrm{CI}_j^{(k-1)}}{\sum_{j=1}^{n_{k-1}} w_j^{(k-1)} \mathrm{RI}_j^{(k-1)}} = \frac{\left(w^{(k-1)}\right)^T \mathrm{CI}^{(k-1)}}{\left(w^{(k-1)}\right)^T \mathrm{RI}^{(k-1)}}. \tag{6}$$

In order to better analyze the influence degree of influence parameter k on CR_1 parameter, the index change curves under different influence parameter k were drawn, as shown in Figure 3.

According to the influence diagram of different parameter k on CR_1 index, it can be seen that with the gradual increase of iteration time, the values of different parameter k show different variation trends. When k is equal to 30, the curve rises slowly, then remains constant, and finally tends to fall. When k is equal to 0, the corresponding curve rises slowly at first and then tends to be stable. When the parameter k is less than zero, the corresponding parameters all show a trend of slow rise at first, then keep constant, and finally increase. It indicates that the decrease of parameter k can further promote the increase of the corresponding value of CR_1 index. It can be seen from the above calculation that the specific value of CR_1 can be described by the variation parameters between $k = -10$ and $k = -20$, and the specific determination method needs further analysis and research.

2.2. Fuzzy Analysis Theory. The research content of fuzzy analysis theory should not only consider the nature and characteristics of the research object itself, but also combine fuzzy theory with all kinds of quantitative problems in reality [9, 10]. In order to use fuzzy mathematics to judge the specific target problem, the model is analyzed and verified by combining qualitative analysis and quantitative analysis, so as to get a scientific and reasonable solution. The characteristics of fuzzy theory are shown as follows: (a) the extension of fuzzy theory has obvious uncertainty; (b) understanding of fuzzy theory is subjective to a certain extent; (c) fuzzy theory is the opposite, but not the opposite, of precision theory; (d) fuzzy theory is conceptually unclear.

Fuzzy set is a simple concept of fuzzy theory. Fuzzy set and its corresponding boundary conditions are not clear, fixed, and indistinguishable. There are many expressions of fuzzy set A, which can be summarized as follows:

$$A = \left\{ \frac{\mu_A(x)}{x}, \quad x \in X \right\} = \sum_{i=1}^{n} \frac{\mu_A(x_i)}{x_i}, \quad x \in X, \tag{7}$$

where, $\mu_A(x)$ is the membership function of the fuzzy set. Set A is the fuzzy set, $\mu_A(x)$ is the membership function of the

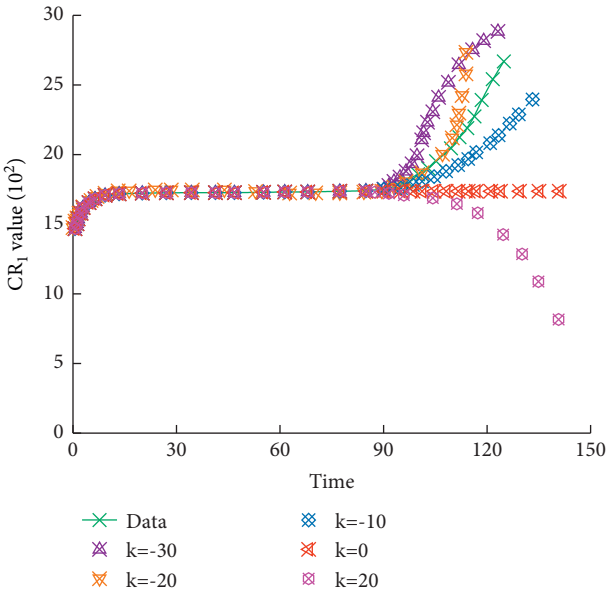

FIGURE 3: Diagram of the influence of parameter (k) on CR_1 index.

fuzzy set we need. The membership function is biased to both ends of its range space and reflects the coupling degree of the case to the fuzzy set one by one. If the membership function value is just at the two endpoints of the function range, the fuzzy set can be reduced to a common mathematical qualitative set.

In fuzzy theory, there are many ways to determine the membership function. In order to get a consistent recognition conclusion, the membership function needs to be modified and optimized for many times [11, 12]:

(1) determination analysis method: determination analysis method is generally applicable to the case of large dispersion of model data, and the reliability of model specimens is relatively low.

(2) Fuzzy statistical method: the method of calculation through the use of model statistical formula. Fuzzy statistical method is an objective method, which is mainly determined based on the objective existence of membership degree on the basis of fuzzy statistical test. The so-called fuzzy statistical test consists of the following four elements:(a) domain, (b) fixed element, (c) set, and (d) fuzzy set.

$$\mu_{A_i}^{p} = \begin{cases} 1, & u \in A_i, \\ 0, & u \notin A_i. \end{cases} \tag{8}$$

where, $\mu_{A_i}^{p}$ is the fuzzy statistical coefficient, and A_i is the fuzzy region. The instructions have been given that u must belong to and only belong to one of the sets A_1, A_2, and A_m. The corresponding membership degree can be expressed as: $\mu_{A_i}(u) = \sum_{p=1}^{n} \mu_{A_i}^{p}/n$.

(3) Membership function determination method: in order to be more accurate and quantifiable, the common distribution function is often used as membership function to express the fuzzy set, including triangle membership function and quadrilateral membership function, two kinds of corresponding function relations.

$$\mu_A(x) = \begin{cases} x - \dfrac{b}{a-b}, & x \in [b, a], \\ c - \dfrac{x}{c-a}, & x \in [a, c], \\ 0, & x \in R - [b, c], \end{cases} \tag{9}$$

$$\mu_A(x, a, b, c, d, H) = \begin{cases} I(x), & x \in [a, b], \\ H, & x \in [b, c], \\ D(x), & x \in [c, d], \\ 0, & x \in R - [a, d], \end{cases}$$

where, $\mu_A(x)$ is triangular membership function; $\mu_A(x, a, b, c, d, H)$ is the quadrilateral membership function; $D(x)$ is the function on the interval $[c, d]$. The $a \le b \le c \le d$, $0 \le H \le I$, $0 \le I(x) \in [a, d]$. In order to explore the influence of different parameters in the quadrilateral membership function on the model, the sensitivity curves of the model under different parameters were drawn, as shown in Figure 4.

It can be seen from the sensitivity analysis diagram of function with different parameters that the sensitivity of function with four different parameters is different, as shown below: with the increase of iteration time, the sensitivity of parameter a firstly slowly increases to the highest point and then gradually shows an approximate linear trend of slow decline. With the increase of iteration time, parameter b presents a trend of slow decline. The slope of the corresponding function curve decreases gradually at first, and finally tends to 0. It shows that with the increase of iteration time, the sensitivity of parameter b to membership function decreases gradually. It can be seen from the variation curve of parameter c that the gradual increase of iteration time will make the corresponding curve also show a relatively large downward trend. Moreover, the decrease range of parameter b exceeds the corresponding iteration range, indicating that parameter c has the characteristics of large influence and short iteration time. The change curve of parameter d shows two typical trends. The first one is the trend of rapid decline, and the second one is the trend of approximate linear increase when it reaches the lowest point. This indicates that the function has typical piecewise points, and that parameter d can be used for sensitivity analysis of different membership functions.

2.3. Fuzzy Analytic Hierarchy Process. The fuzzy analytic hierarchy process can analyze different dimensions and calculate the influence degree of each factor on the overall objective [13, 14]. In order to further explain the calculation process of fuzzy analytic hierarchy process, the corresponding fuzzy analytic hierarchy process is drawn, as shown in Figure 5. Different calculation forms in the state

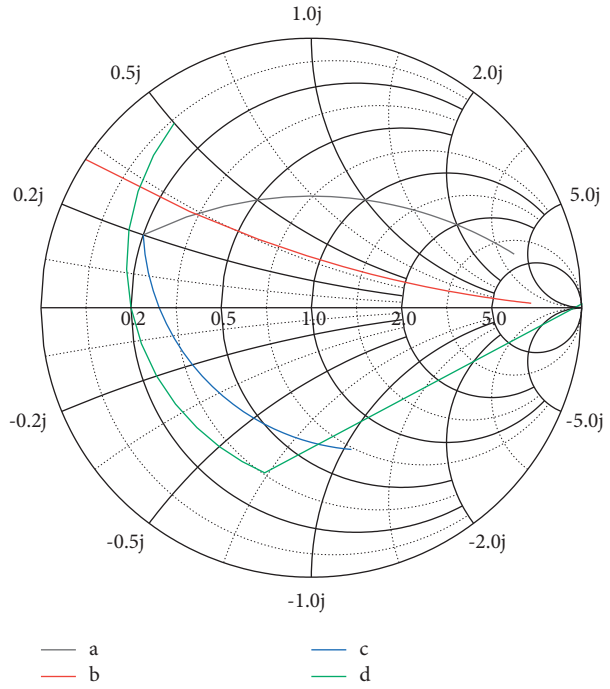

Figure 4: Sensitivity analysis diagram of different parameters to membership function.

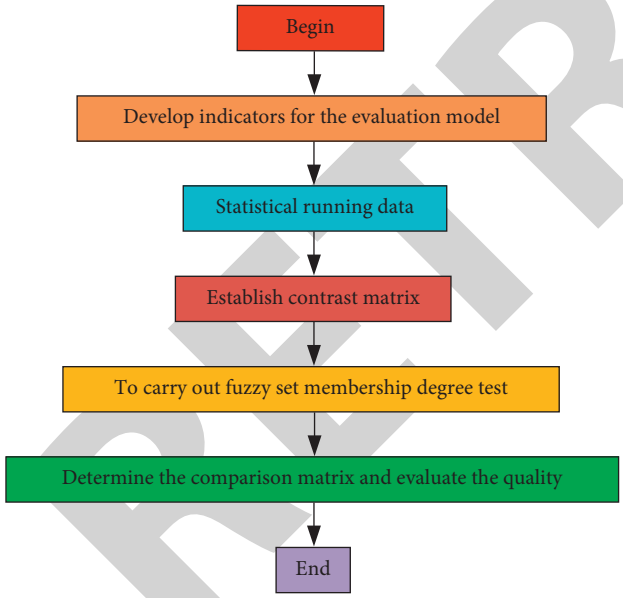

Figure 5: Flow chart of fuzzy analytic hierarchy process.

comprehensive evaluation module are shown as follows: (a) prominent main factor type: after identifying the main influencing factors, further strengthening them will further weaken the other indicators and continuously reflect the distinction and contrast; (b) comprehensive constraints: the original indicators are modified so as to have a restrictive effect; (c) weighted average type, in which the contribution rates of different indicators to evaluation objectives are represented by weights.

It can be seen from the flow chart of fuzzy hierarchy analysis that, firstly, relevant data obtained from membership function analysis theory are imported into the indicator analysis module of the established evaluation model. Calculate and analyze the relevant data through the indicator statistics of the evaluation model, and then, import the obtained analysis data into the corresponding comparison matrix. The membership test and sensitivity analysis of fuzzy function can be realized by checking the comparison matrix. When the calculation result of membership function exceeds the sensitivity requirement, the quality test data can be determined through the comparison matrix, and the corresponding theoretical analysis and evaluation can be carried out. Finally, the relevant data of quality inspection and evaluation and index system construction of college teachers are derived. The corresponding fuzzy analytic hierarchy process mainly includes fuzzy transformation and fuzzy calculation model.

Fuzzy transformation: fuzzy transformation requires the comprehensive expansion of the evaluation basis of weighted summation through the calculation of fuzzy theory and fuzzy set, so as to establish the corresponding evaluation index set U, and the final evaluation results are shown as follows.

$$B = A \odot B = (a_1, a_2, \ldots, a_n) \odot \begin{bmatrix} r_{11} & r_{12} & \cdots & r_{1m} \\ r_{21} & r_{22} & \cdots & r_{2m} \\ \vdots & \vdots & \ddots & \vdots \\ r_{n1} & r_{n2} & \cdots & r_{nm} \end{bmatrix}, \quad (10)$$

where B is the fuzzy vector, and A is the fuzzy vector in the evaluation index set U.

Fuzzy calculation model: for fuzzy comprehensive evaluation method, fuzzy analytic hierarchy process is adopted to evaluate, and comprehensive evaluation is carried out one by one:

(1) establishment of factor set U of the underlying evaluation index: the underlying evaluation index set is U, and each weight vector together forms a fuzzy vector A, so as to explain the different importance of each index.

(2) The establishment of evaluation set V: to construct a scientific and reasonable fuzzy evaluation set V, so that the results can be accurately reflected in the evaluation set.

(3) Establishment of evaluation matrix of underlying indicators: element calculation method is as follows.

$$u_i: R(u_i) = \frac{r_{i1}}{v_1} + \frac{r_{i2}}{v_2} + \cdots + \frac{r_{im}}{v_m}. \quad (11)$$

Through fuzzy evaluation, the fuzzy evaluation matrix on $U \times V$ is constructed as follows:

$$R = \begin{bmatrix} r_{11} & r_{12} & \cdots & r_{1m} \\ r_{21} & r_{22} & \cdots & r_{2m} \\ \vdots & \vdots & \ddots & \vdots \\ r_{n1} & r_{n2} & \cdots & r_{nm} \end{bmatrix}. \quad (12)$$

(4) State comprehensive evaluation: B is obtained by fuzzy transformation according to A and R. The maximum membership criterion of modular mathematics is reversely applied to obtain comprehensive evaluation after calculation. The calculation is as follows:

$$B = A \odot B = (a_1, a_2, \ldots, a_n) \odot \begin{bmatrix} r_{11} & r_{12} & \cdots & r_{1m} \\ r_{21} & r_{22} & \cdots & r_{2m} \\ \vdots & \vdots & \ddots & \vdots \\ r_{n1} & r_{n2} & \cdots & r_{nm} \end{bmatrix} = (b_1, b_2, \ldots, b_n). \quad (13)$$

In order to further analyze the solution process of vector B, change curves of different vectors were drawn, as shown in Figure 6. From the variation trend of different vectors, we can see that A and R vectors have different influence degrees on index B and have typical segmentation characteristics. First of all, it can be seen from the change curve of vector A that this line segment has typical segmenting characteristics. When the iteration speed is between 0 and 1800, the curve corresponding to the matrix value of vector A and that of vector B have basically the same change trend. With the increase of iteration speed, the corresponding curve gradually reaches the highest point, and then with the further increase of iteration speed, the corresponding curve value drops rapidly, with typical segmentation characteristics. It can be seen from the change curve of vector R that the corresponding matrix data shows a slow increasing trend with the increase of the number of iterations. However, when the iteration rate exceeds about 1800, it shows a rapid increasing trend, while when the iteration rate exceeds 2000, it shows a sudden slight decrease. It can be seen from the change curve of vector B that the curve has a typical increasing trend. With the increase of iteration speed, the corresponding matrix values show a linear changing trend. The slope of the corresponding curve still shows an increasing trend, indicating that the increase of iteration speed can make the matrix data increase rapidly. The iterative data of matrix vector B can be obtained through vector A and R, and it can be seen from the data that the process of solving vector B by vector A and vector R is not a simple calculation, but a complex iterative solution.

3. Application of Fuzzy Analytic Hierarchy Process in College Teachers

The construction of college teachers is very important for the development of higher education. In order to explore the evaluation method of quality monitoring of college teachers and the construction process of corresponding index system, the construction of college teachers is analyzed and researched based on fuzzy analytic hierarchy process [15, 16]. Thus, the analysis process of the quality of college teachers under different evaluation factors is obtained, as shown in Figure 7.

It can be seen from the quality evaluation chart of statistical indicators under different evaluation factors that

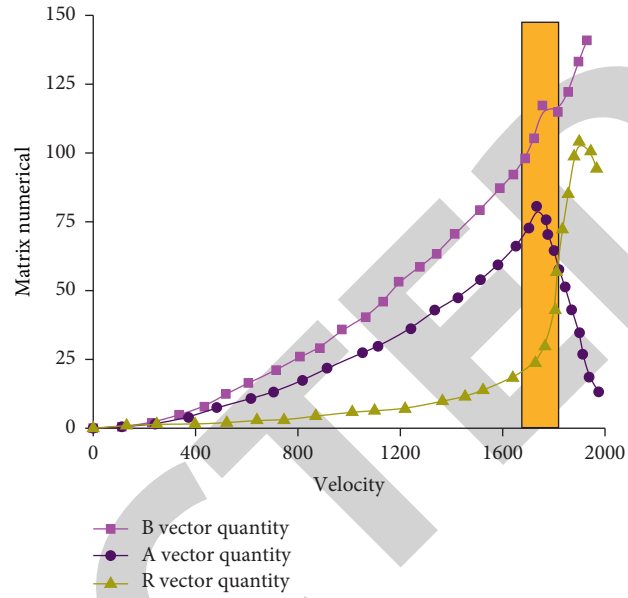

Figure 6: Change process diagram of vector (B).

quality evaluation can be divided into three parts: the first part is determining function, the second part is iterative solution, and the third part is the comparison of corresponding indicators. The specific analysis process is as follows: firstly, the relevant indicators of quality monitoring in the faculty of colleges and universities are imported into the relevant modules of the criterion layer. By determining the iterative relations in the function criterion layer, the relevant parameters of the model are solved, and then, the corresponding judgment basis is obtained. The corresponding judgment function is obtained through the correlation coefficient of the function, and then, the judgment function is imported into the solution module, and consistency test and model reconstruction are carried out at the same time. Through the iterative process of consistency test and model reconstruction, the influence range and degree of the judgment matrix in the faculty of colleges and universities are obtained. Finally, the corresponding scope of influence and indicators are imported into the comparison module, and the relevant quality evaluation data is finally exported through the circulation function of the modules such as consistency test, quality detection evaluation, and index system evaluation again.

3.1. Quality Monitoring and Evaluation of College Teachers. The quality inspection of college teachers is an important part of the construction of college teachers. In order to quantitatively analyze the problems existing in college teachers, different indicators are used to analyze them [17, 18]. The first-level indicators mainly include: professional ethics, professional quality, research tasks, research summary, and research environment [19, 20]. The corresponding secondary indicators mainly include: ethics, professional attitude, faculty, theoretical basis, teaching ability, work pressure, physical and mental health, scientific research achievements, teacher evaluation, working environment, research pressure, and

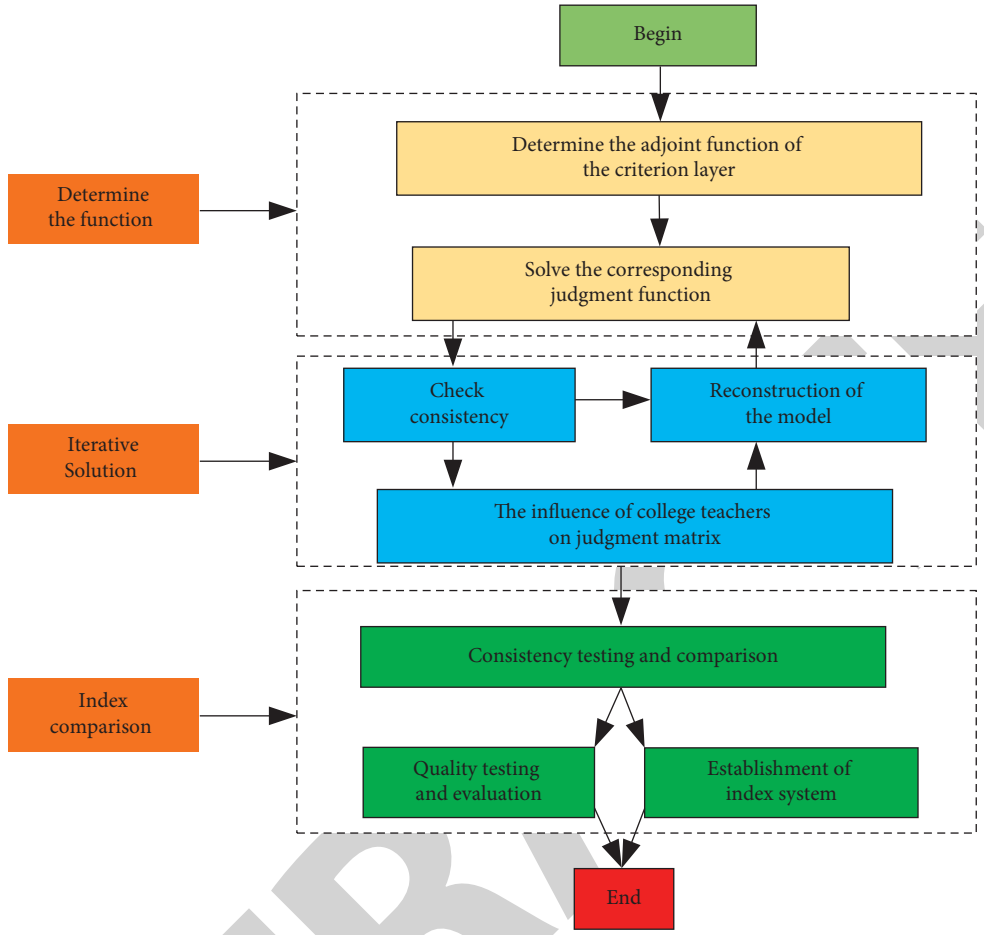

Figure 7: Quality evaluation chart of university teachers under different evaluation factors.

other indicators. In order to better analyze the influence weight of different levels of indicators on the quality of college teachers, *CR* and *CI* indicators in fuzzy analytic hierarchy process are used to monitor and analyze college teachers. The specific results are shown in Figure 8, and the relevant results are shown in Table 1.

According to the weight analysis chart of quality monitoring of university teachers under different indicators, we can see that the weight of scientific research task is 0.36, and the weight of scientific research summary is 0.272. The corresponding weight of professional ethics is only 0.21, professional quality is 0.13, and the corresponding research environment is the lowest 0.03. Different first-level indicators can be subdivided into different second-level indicators. The first-level indicators are analyzed by using *CI* weights, while the corresponding second-level indicators are described by using *CR* weights. Then, through the second-level indicators, we can see that the weight of work pressure is 0.21, accounting for the highest proportion, while the lowest proportion is the work environment in the scientific research environment, which is only 0.01, indicating that work pressure has the greatest impact on the quality monitoring of university teachers.

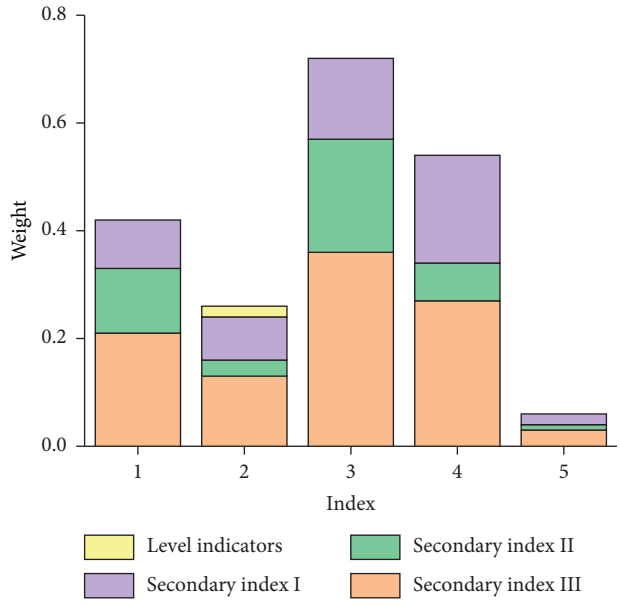

Figure 8: Weight analysis chart of quality monitoring of college teachers under different indicators.

Table 1: Summary of quality monitoring under different indicators.

Number	Level indicators	*CI* weight	Secondary indicators	*CR* weight	Comprehensive order
1	Professional ethics	0.21	Ethics	0.12	5
			Professional attitude	0.09	6
2	Professional quality	0.13	Faculty	0.03	8
			Theoretical basis	0.08	7
			Teaching ability	0.02	9
3	Research tasks	0.36	Work pressure	0.21	1
			Physical and mental health	0.15	2
4	Research summary	0.27	Scientific research achievements	0.07	4
			Teacher evaluation	0.20	3
5	Research environment	0.03	Working environment	0.01	11
			Research pressure	0.02	10

Table 2: College index system construction summary table.

Vector	Factor	Index	Weight	Coefficient
B	Professional quality	1-Team structure B_1	0.07	0.961
		2-Concept of knowledge B_2	0.02	0.923
		3-Professional proficiency B_3	0.03	0.943
	Younger age of the team	4-Education level B_4	0.12	0.912
		5-School age indicators B_5	0.13	0.972
		6-Professional title appraisal B_6	0.04	0.962
A	Knowledge level	7-Disciplinary knowledge A_1	0.13	0.892
		8-Pedagogical knowledge A_2	0.11	0.914
		9-Knowledge A_3	0.01	0.887
	Professional ability	10-Teaching design A_4	0.03	0.789
		11-Classroom harmony A_5	0.04	0.862
		12-Information development A_6	0.06	0.785
R	Psychological quality	13-Quality-oriented education R_1	0.11	0.956
		14-Heart health R_2	0.04	0.936
		15-Communication R_3	0.06	0.978

3.2. Construction of Index System of College Teachers. In view of the problems existing in the quality monitoring process of college teachers, fuzzy analysis method is adopted to calculate, and relevant calculation results are obtained. However, the construction of the index system of college teachers also needs to be analyzed by relevant algorithms [21, 22]. Therefore, in order to explore the relevant content of index system construction in the faculty of colleges and universities, the fuzzy vector analysis method based on the fuzzy hierarchy analysis theory is adopted to calculate and analyze the relevant data. The specific results are shown in Table 2, and the corresponding index system construction analysis is shown in Figure 9.

The index system under different factors mainly includes professional quality, younger age of the team, knowledge level, professional ability, and psychological quality, etc., In order to better analyze the construction of the index system of college teachers, we divided the relevant factors into specific categories, each representing three different aspects. By introducing it into fuzzy analytic hierarchy process, corresponding weight analysis can be obtained. Figure 9 shows the construction of relevant index system in the faculty of colleges and universities. We can see that the data

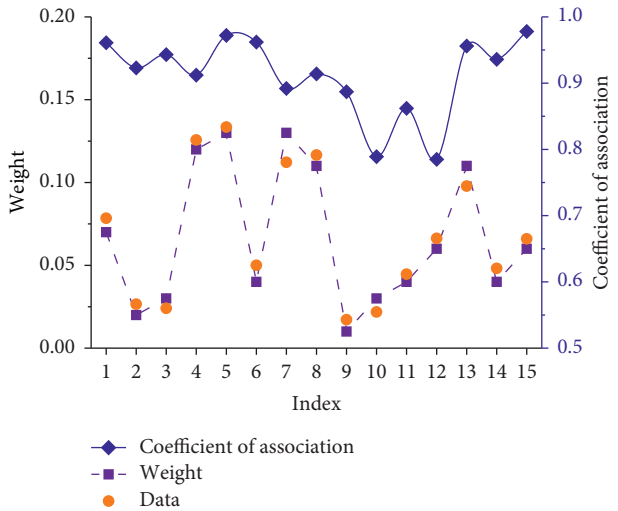

Figure 9: Analysis chart of index system construction in colleges and universities.

obtained by weight analysis method for the construction of the index system of colleges and universities are basically consistent with the experimental data. It stays within the

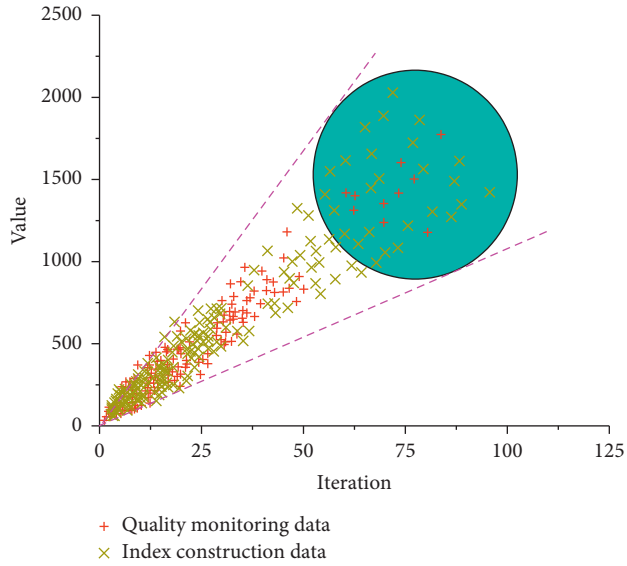

Figure 10: Evaluation and analysis chart of model with different indexes.

range of 0 to 0.15, and the corresponding relationship obtained by fuzzy analytic hierarchy process is generally high, the correlation coefficient is higher than 0.7, mainly concentrated around 0.9, indicating that the analytical method has a good accuracy in the research on the quality system and index system of college teachers.

4. Discussion

Finally, in order to further analyze the impact of different data on model evaluation, the impact range of quality monitoring data and index construction data on the model is counted, as shown in Figure 10. It can be seen from the data that the changes of the two kinds of data remain in a linear range as a whole. When the number of iterations exceeds 50, the corresponding iteration parameters are relatively small. The parameters of the two models are mainly concentrated in the range of 0–25, while the corresponding data remain in the range of 0–2500 as a whole, indicating that the fuzzy analytic hierarchy model under the two data has relatively good linear characteristics.

5. Conclusion

(1) The proportion of the two different judgment indexes to model parameters is different. With the increase of iterations, the *CI* of judgment indexes shows a trend of gradual improvement. While the iteration index CR showed a trend of gradual decline, it can be seen that neither of the two iteration indexes can better reflect the change trend of the data. Judgment indexes and iteration indexes need to be considered comprehensively.

(2) Different parameters lead to different sensitivity analysis of functions according to their different influences on the model. Parameters *a*, *b*, and *c* can only reflect the local characteristics of model parameters, while parameter *d* shows obvious stage characteristics.

(3) The staged characteristics of vector *A* and vector *R* on the iteration speed indicate that the analysis of vector on the model shows certain nonlinear characteristics. It can be seen from the vector curve that the complex iterative solution method is needed to obtain vector *B*.

Data Availability

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

Conflicts of Interest

The authors declared that they have no conflicts of interest regarding this work.

Acknowledgments

This work was funded by Jiangsu Higher Education Society of Higher Education Education Reform Research Project (2019JSJG507).

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