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Retraction

Retracted: Relationship Model between Human Resource Management Activities and Performance Based on LMBP Algorithm

Security and Communication Networks

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This article has been retracted by Hindawi, as publisher, following an investigation undertaken by the publisher [1].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] L. Qiang and Z. Zhongwei, "Relationship Model between Human Resource Management Activities and Performance Based on LMBP Algorithm," *Security and Communication Networks*, vol. 2022, Article ID 1125084, 11 pages, 2022.

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Research Article

Relationship Model between Human Resource Management Activities and Performance Based on LMBP Algorithm

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The research on the relationship between human resource management activities and performance is an important topic of enterprise human resource management research. There are some errors between the relationship between human resource management activities and performance and the real situation, so it is impossible to accurately predict the performance fluctuation. Therefore, the relationship model between human resource management activities and performance based on the LMBP algorithm is constructed. Using the Levenberg–Marquardt (LM) algorithm and BP (back-propagation) neural network algorithm to establish a new LMBP algorithm, control the convergence of the new algorithm, optimize the accuracy of the algorithm, and then apply the LMBP algorithm to predict the risk of performance fluctuation under human resource management activities of enterprises, the indicators of human resource management activities of enterprises are determined, to complete the mining of enterprise performance data, the grey correlation analysis is combined, and the relationship model between human resource management activities and performance is built. The experimental samples are selected from CSMAR database, and the simulation experiment is designed. Using different algorithms to forecast the fluctuation of enterprise performance, the experimental results show that the LMBP algorithm can more accurately reflect the relationship between enterprise HRM and performance.

1. Introduction

With the development of market economies and the intensification of competition, enterprise performance has become the main aspect of competitive advantage. Only by considering many factors, enterprises can improve their own performance, but we cannot ignore the main factor of human resources. Traditionally, human resource management has always been given a professional role. The focus of the organization's attention to human resource management is whether the daily recruitment, selection, appointment, performance evaluation, salary system, training, and other professional activities can operate smoothly. The role of human resource activities at the organizational level has clearly not been taken seriously [1, 2]. In recent years, with the development of the concept of strategic human resource management, people regard human resource as a strategic contributor to an enterprise.

In reference [3], based on high-order theory and stakeholder theory, taking Chinese enterprises as the research object, this study tests the impact of executive human resource management commitment on enterprise environmental protection performance and financial performance and discusses the intermediary mechanism of green human resource management between the two. The results show that the executive human resource management commitment indirectly affects the environmental performance and financial performance of enterprises, and green human resource management plays an intermediary role in this process; enterprise scale positively regulates the relationship between executive human resource management commitment and green human resource management and positively regulates the intermediary role of green human resource management between executive human resource management commitment, environmental performance, and financial performance. Reference [4] selects the adaptive GA-BP (AGA-BP) algorithm and adds jump genes on the basis of GA-BP algorithm and AGA-BP algorithm, called jg-ga-bp algorithm and jg-aga-bp algorithm, to solve the classification problem. Based on the genetic algorithm, the algorithm adds jump gene operator to optimize the structural parameters of BP neural network, to establish the corresponding neural network topology model. To verify the classification effect of the learning algorithm after adding jump gene, the performance of jg-aga-bp algorithm, jg-ga-bp algorithm, AGA-BP algorithm, and GA-BP algorithm is compared. In reference [5], based on the strategic perspective and BSC theory, a set of scientific inclusive human resource management performance evaluation index system is constructed, and then, the BSC matter-element model method is adopted. Taking three enterprises as an example, this study empirically analyzes the strategic inclusive human resource management performance. The results show that there may be a certain gap in the inclusive human resource management performance level of different enterprises, and there is an imbalance in the different abilities reflecting the inclusive human resource management performance of an enterprise. There is also a certain gap in these abilities of human resource management among enterprises. Reference [6] puts forward a new idea of two-stage discrimination of credit evaluation index combination screening, constructs an enterprise performance evaluation index system with stronger sensitivity and discrimination, and makes an empirical analysis using the credit data of 3111 small enterprises. The small enterprise performance index discrimination model based on two-stage logistic regression means that, firstly, the performance is divided into standard and nonstandard by logistic regression. Reference [7] takes 15 listed companies in agriculture and animal husbandry in Shanghai and Shenzhen as the research object, selects 8 indicators reflecting the financial development of enterprises, and extracts 4 principal components by principal component analysis to evaluate the financial performance of enterprises. The results show that the first principal component can be used to reflect the profitability of enterprises; the second principal component can be used to explain the company's solvency; the third principal component can be used to explain the company's growth ability; and the fourth principal component can be used to explain the business ability of enterprises. The research results are basically consistent with the facts, which can provide a reference for managers and investors to objectively evaluate enterprise performance.

Based on the above research, a new relationship model between enterprise human resource management activities and performance based on LMBP algorithm is constructed. The LMBP algorithm is used to predict the fluctuation of enterprise performance under human resource management activities. The innovation of the research is to design convergence control and precision control. On this basis, the LMBP algorithm process is improved; based on LMBP algorithm, the relationship model between enterprise human resource management activities and performance is designed. The application effect of LMBP algorithm optimizes the literature method, which can more accurately reflect the relationship between enterprise human resource management activities and performance.

2. Application Accuracy Control of LMBP Algorithm

2.1. Convergence Control of LMBP Algorithm. The LMBP algorithm often appears in the overall algorithm together with BP neural network, will return the output energy function E, and substitutes to improve the algorithm [8], as the basis of fitness function F, so that $F = C/E$, where C is a constant term. The new individuals are compared with other individuals, and based on the most similar criterion, the individuals that are most similar to the new individuals are selected and replaced by new individuals. Similarity calculations are defined by the Euclidean distance [9], as shown in the following formula:

$$\text{dist}\left(\text{Ind}_i;\text{Ind}_j\right) = w_x \cdot \left(\text{ED}\left(x_i;x_j\right)\right) + w_F \cdot \left(\text{ED}\left(f_i;f_j\right)\right). \quad (1)$$

In the above formula,

$$\text{ED}\left(x_i;x_j\right) = \sum_{k=1}^{\text{size}\left(x_i\right)} \left(x_i(k) - x_j(k)\right)^2. \quad (2)$$

Formula (2) represents the Euclidean distance between individual x_i and individual x_j. w_x and w_F represent the weights of $\text{ED}(x_i;x_j)$ and $\text{ED}(f_i;f_j)$, respectively, and k represents the number of iterations.

In an improved algorithm, there are generally two situations in which an individual can be converted between a child and a parent:

(1) To treat all newly created individuals as offspring and replace the individual of the parent generation as a whole

(2) By comparing the newly generated individuals with the original ones, the better ones shall be retained for the next generation of iterations

Of the two cases, the first one has obvious advantages in global optimization, but the convergence efficiency is not ideal [10–12]; the second one is obviously faster than the first one, but it is easy to fall into local optimization. To balance the two cases, we observe the periodicity of the newly generated individuals, replacing the old individuals with the newly generated individuals every L instead of using the closest similarity criterion.

2.2. Precision Control of LMBP Algorithm. The LMBP algorithm integrates the advantages of gradient descent method and the Gauss–Newton method and realizes fast operation through standard numerical optimization technology [13, 14].

$x^{(k)}$ is defined as the vector composed of weight value and threshold value during the calculation of iteration k. The newly obtained vector $x^{(k+1)}$ composed of weight value and threshold value can be calculated by the following formula:

$$x^{(k+1)} = x^{(k)} + \Delta x. \tag{3}$$

The Gauss–Newton law is realized in the following form:

$$\Delta x = -\left[\nabla^2 E(x)\right]^{-1} \nabla E(x). \tag{4}$$

In the formula, $\nabla^2 E(x)$ represents the Hessian matrix of error index function $E(x)$; $\nabla E(x)$ represents the gradient information of Newton's method.

$E(x)$ is defined as the form of the following formula:

$$E(x) = \frac{1}{2} \sum_{i=1}^{L} e_i^2(x). \tag{5}$$

In the formula, $e(x)$ represents the error function and L represents the improved algorithm level. Then, we can infer the following:

$$\begin{cases} \nabla E(x) = J^T(x) e(x), \\ \nabla^2 E(x) = J^T(x) e(x) + S(x). \end{cases} \tag{6}$$

In the formula, T represents the regression coefficient to be estimated [15], and the Jacobian matrix can be obtained as follows:

$$J(x) = \begin{bmatrix} \frac{\partial e_1(x)}{\partial x_1} & \frac{\partial e_1(x)}{\partial x_2} & \cdots & \frac{\partial e_1(x)}{\partial x_n} \\ \frac{\partial e_2(x)}{\partial x_1} & \frac{\partial e_2(x)}{\partial x_2} & \cdots & \frac{\partial e_2(x)}{\partial x_n} \\ \cdots & \cdots & \cdots & \cdots \\ \frac{\partial e_N(x)}{\partial x_1} & \frac{\partial e_N(x)}{\partial x_2} & \cdots & \frac{\partial e_N(x)}{\partial x_n} \end{bmatrix}. \tag{7}$$

The calculation rule of the Gauss–Newton method stipulates that

$$\Delta x = -\left[J^T(x) J(x)\right]^{-1} J(x) e(x). \tag{8}$$

The LMBP algorithm is partially improved on the basis of the Gauss–Newton method, as shown in the following formula:

$$\Delta x = -\frac{e(x)}{\left[J^T(x) J(x) + \mu \Delta U\right]}. \tag{9}$$

In the formula, $\mu > 0$ is a constant term and ΔU is the identity matrix.

It can be seen from the calculation of the formula (9) that when $\mu = 0$, it is still the Gauss–Newton method, and when the value of μ becomes larger and larger, it tends to the gradient descent method. In the Gauss–Newton method in the control error aspect, the computation speed is quicker, and the error precision control is also higher. Because the approximate second derivative information is introduced into the LMBP algorithm [16–18], the computational efficiency is greatly improved in the calculation process. The algebraic formula of order is needed to modify the weights and thresholds through formula (9). The computational complexity of LMBP algorithm is $O(n^3/6)$, and when the value of n is large, the computational complexity and complexity are generally large. However, it is obvious that the efficiency of iterative computation is increasing and the performance of the algorithm is improved, especially in error control.

2.3. Improved LMBP Algorithm Flow. Based on the improved LMBP algorithm, this study proposes a new algorithm LMBP algorithm for enterprises. Firstly, the overall quality of analysis is improved by improving the algorithm, combined with LMBP algorithm for training. The calculation model of LMBP algorithm [19] is shown in Figure 1.

Throughout the calculation of the LMBP algorithm in Figure 1, you can see that each algorithm is limited to its own specific range. On the one hand, the genetic algorithm [20, 21] ensures the global convergence of the whole calculation process and avoids the Gauss–Newton method falling into the local optimization state; on the other hand, the combination of the genetic algorithm and the LMBP algorithm is very effective for improving the search efficiency. It can be concluded that the LMBP algorithm has better convergence, and it not only reduces the dependence on the algorithm but also ensures the convergence direction of the algorithm, and even in the case of less intrinsic relationship between the problem, it can still get good training results for performance data.

3. Relationship Model between Enterprise Human Resource Management Activities and Performance Based on LMBP Algorithm

3.1. Performance Fluctuation Risk Prediction under Enterprise Human Resource Management Activities. To eliminate the problem that cannot be measured uniformly, the multilayer forward neural network of error back-propagation algorithm [22], namely, BP neural network [23], is used to deal with each evaluation index in a non-dimensional way. Learning is used to regulate the relationship between neurons in each layer and is shown in Figure 2.

In Figure 2, BP neural network is divided into the input layer, hidden layer, and output layer. Data are transmitted from the input layer to the hidden layer and then to the output layer. Lines play the role of transmission. The input neuron is set to $m(i = 1, 2, \ldots, x)$, and the output neuron is set to $n(j = 1, 2, \ldots, y)$. According to the relationship between hidden layer neurons and input neurons, the specific number of hidden layer neurons is obtained, and the input range of y neuron (m_y, n_y) is known, and then, $m_y = (m_1^y, m_2^y, m_3^y, \ldots, m_x^y)$ and $n_y = (n_1^y, n_2^y, n_3^y, \ldots, n_x^y)$.

The weighted sum of the input unit n_j of the j by LM algorithm is as follows:

$$S_{nf} = \sum_{k-1}^{q} R_x c_k. \tag{10}$$

In formula (10), c_k represents the k th hidden layer unit.

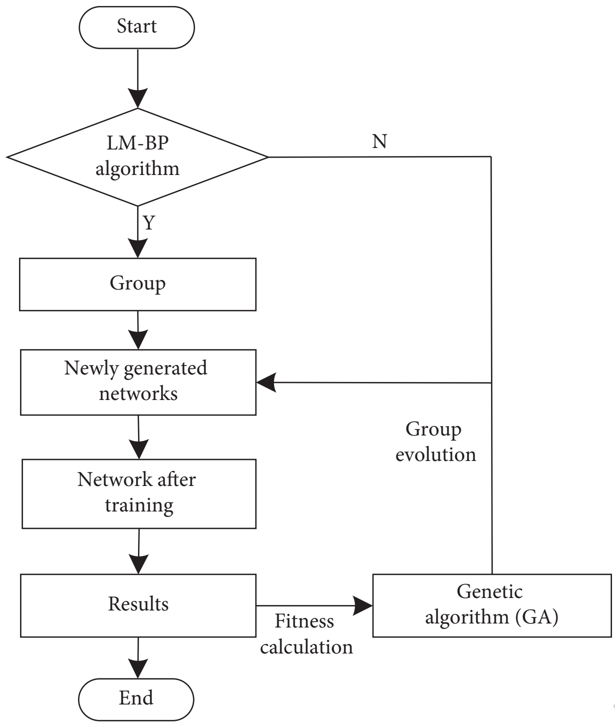

Figure 1: Calculation model of LMBP algorithm.

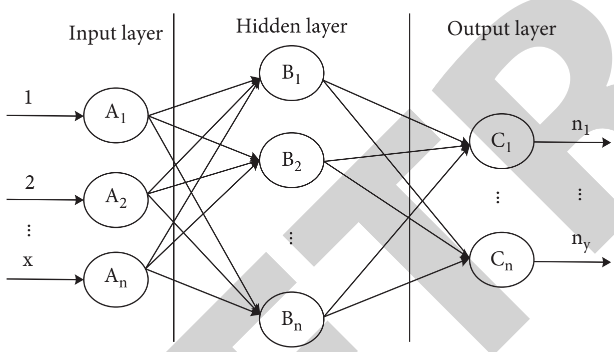

Figure 2: Schematic diagram of BP neural network.

Then, the actual output of LM algorithm unit is as follows:

$$n_f = f\left(S_{nf}\right) = \frac{1}{B^{-S_{nf}}}. \tag{11}$$

In formula (11), $f(\cdot)$ represents the sigmoid function, and the weighted input sum of the k hidden layer unit is as follows:

$$S_{ck} = \sum_{k-1}^{q} R_{jk} c_k. \tag{12}$$

The connection weights are resent between the output unit j and the hidden layer k.

The number of neural units in the input layer is set to n, and the number of units in the output layer is set to 0 or 1. 0 means that there is no risk in human resource management, and 1 means that there is risk in human resource management.

3.2. Determination of Enterprise Human Resource Management Activity Indicators. After the crisis, the enterprise human resource management will show certain characteristics, which can be used to select the basic early warning variables of human resource management. It is divided into the following five categories: cash flow, profitability, growth capacity, operating capacity, and solvency, but based on practical work experience, seven categories of a total of 98 indicators were selected as alternative research indicators [24–26]. Because of the limitation of calculation method, the redundancy of high-dimensional data is high and the calculation is difficult, which may affect the final forecast result. The data quantity processed by neural network is small. The index variables that are less referential to the results of the performance volatility risk forecast under the enterprise's human resource management activities are removed from the original data, and then, the data indicators whose data format is not completely consistent due to the multiple changes in the disclosure requirements of the company's human resource management statements are removed. The final index variables selected are the solvency, ratio structure, operating capacity, profitability, risk level, per share index, and relative value, of which the solvency, operating capacity, and profitability have the greatest impact on the risk forecast [27]. The classification of these three specific indicators is shown in Table 1:

As shown in Table 1, different categories of indicators have different characteristics and different indicators have different dimensions [28, 29], and the role of fewer orders of magnitude indicators in projections may be overshadowed by the role of larger orders of magnitude indicators.

3.3. Enterprise Performance Data Mining. Based on the improved LMBP algorithm, the enterprise performance data are mined. Firstly, the enterprise performance data are collected and the preliminary data are mined by the data mining algorithm [30, 31]. Firstly, the mining data need to be classified and divided into 3 parts, one part is used to determine the improved BP neural network model, one part is used to train the improved BP neural network, and the other is used to test it. Its allocation proportion is about half of the training data, about a quarter of the confirmed data, and about a quarter of the test data. The data mining ability of improved BP neural network model can be strengthened by the allocation ratio [32].

The first step of constructing the improved BP neural network model is to select the predictive index and take the enterprise performance as the predictive index. Then, the output and input vectors are designed. The input layer is used for data input, so it is necessary to set input layer nodes as input vectors according to the number of data sources. The steps to determine the number of data sources are shown in Table 2.

The excitation function of the input layer node is as follows:

$$f(v) = \frac{1}{1 + \exp(-\alpha)v}. \tag{13}$$

Table 1: List of index classification.

Classification name	Number of indicators	Indicator name	Indicator name
Solvency		Current ratio	Cash ratio
Operating capacity		Working capital-to-loan ratio	Interest cover
Profitability		Net cash flow from operating activities	Cash flow interest cover
Classification name	14	Amount/current liabilities	Asset liability ratio
Solvency		Cash flow interest maturity debt guarantee times	Ratio of long-term loans to total assets
Operating capacity		Number	Total EBITDA/liabilities
Profitability		Equity multiplier	Net cash flow/interest bearing debt
Classification name		Equity-to-liability ratio	Accounts receivable turnover
Solvency		Net cash flow/total liabilities	Turnover rate of accounts payable
Operating capacity	9	Ratio of accounts receivable to income	Turnover rate of cash and cash equivalents
Profitability		Inventory turnover	Turnover rate of fixed assets
Classification name		Working capital (capital) turnover rate	—
		Turnover rate of current assets	Net profit margin of current assets
		Total asset turnover	Net profit margin of fixed assets
		Return on assets	Total profit compared with EBIT
Solvency	14	Return on net assets	Return on invested capital
		Ratio of net profit to total profit	Operating gross profit margin
		Ratio of EBIT to total assets	Net operating interest rate
		Long-term return on capital	Ratio of cash to total profit

Table 2: Specific contents of steps for determining the number of data sources.

Serial number	Step	Concrete content
1	Establishment of fitting state	Establish the fitting state while maintaining the simulation environment
2	Data denoising	Clear error data
3	Data source exclusion	Exclude unreliable or boundary data sources
4	Algorithm selection	The algorithm of data preprocessing is selected, especially the algorithm of data defect compensation difference

In the formula, $f(v)$ represents the excitation function of the input layer node; v represents function independent variable; and α represents the slope control parameter.

The output vector is the corresponding neuron of the output layer, which is determined according to the type of mining data. The output calculation formula of the output vector is as follows:

$$O_i = f\left(\sum_i T_{ii} - \theta_i\right). \tag{14}$$

In the above form, O_i represents the output vector, T_{ii} represents the weight of the output node, and θ_i represents the threshold value of the output layer.

Then, the specific number of layers of the improved BP neural network is selected; that is, the specific number of neurons in the hidden layer is adjusted, and the corresponding nodes of the hidden layer are selected; that is, a few hidden layer nodes are invested and then the number of nodes is gradually increased until the number of nodes is more reasonable. This process needs to be tested. The corresponding output formula of hidden layer nodes is as follows:

$$y_i = f\left(\sum_j w_{ij} x_j - \theta_i\right). \tag{15}$$

In the formula, y_i represents the corresponding output of the hidden layer node; w_{ij} represents the corresponding network weight of the hidden layer; and x_j represents the input node.

The LM algorithm is used to train samples. First, eight neurons are input and then increased to fifteen. The specific training results are shown in Table 3. The number of neurons corresponding to the optimal combination of training times and training error is selected.

According to the table above, the error can be kept to a minimum when the number of neurons is 15.

Then, the network error test is carried out using various training functions. The type of training function represents the improvement method of BP neural network. The results of network error test are shown in Table 4.

According to the results in the above table, LM is selected to improve BP neural network. According to the results in Tables 3 and 4, a three-layer improved BP neural network model with 4, 15, and 1 input nodes, 1 output node, and 15

Table 3: Specific training results.

Number of neurons/piece	8	9	10	11	12	13	14	15
Network error	2.9805	0.8741	1.2141	1.5189	0.8217	0.3465	0.8551	0.8231

Table 4: LM algorithm training error test results.

Training function name	Dm	Da	Dx	Lm
Average network error	0.0014	0.0109	0.0041	0.0007

implicit nodes is constructed. There are 90 training samples and 20 testing samples in the model. The improved BP neural network model is shown as follows:

$$\begin{cases} f\left(X^{(k+1)}\right) = \min f\left(X^{(k)} + \eta^{(k)} S\left(X^{(k)}\right)\right), \\ X^{(k+1)} = X^{(k)} + \eta^{(k)} S\left(X^{(k)}\right). \end{cases} \tag{16}$$

In the formula, $X^{(k)}$ represents the vector composed of the threshold of the network and all values; $S(X^{(k)})$ represents the search direction of the space vector composed of each functional component in X; and $\eta^{(k)}$ represents the minimum step size.

The improved BP neural network model is used to deeply mine enterprise performance data.

3.4. Construction of Relationship Model between Enterprise Human Resource Management Activities and Performance under Grey Correlation Analysis. Based on the enterprise performance data mined above, the human resource management activities shall be clustered in accordance with the month, the maximum number of participants, and the activity frequency level in turn using the grey relational analysis [33], and the distribution data of human resource management activities shall be divided into several cluster groups, and multiple regression shall be adopted in turn to record the frequency of human resource management activities of the enterprises in an analytical form [34, 35]:

$$c = a_0 + \sum_{i=1}^{7} a_i \cdot x_i. \tag{17}$$

The regression formulas of different human resource management activities under different performance states shall be used in the prediction of the frequency of human resource management activities, and the standardized average deviation, standardized average error, and root-mean-square error shall be used to judge the degree of fit between the calculation results and the real results. The calculation process is as follows:

$$\begin{aligned} \mathrm{NMB} &= \frac{\sum_1^N \left(C_m - C_b\right)}{\sum_1^N C_b} \times 100\%, \\ \mathrm{NME} &= \frac{\sum_1^N \left|C_m - C_b\right|}{\sum_1^N C_b} \times 100\%, \\ \mathrm{RMSE} &= \sqrt{\frac{\sum_1^N \left(C_m - C_b\right)^2}{N}}. \end{aligned} \tag{18}$$

In the formula, C_m represents the simulated value, and C_b represents the observed value. NMB is the average deviation level of each simulated value from the real value, NME is the average absolute error, and both NMB and NME are statistics without dimensions. E can show the deviation level between the simulated value and the observed value. The closer the value of RMSE is to 0, the better the simulation effect is. In addition, the correlation coefficient R is used to describe the coincidence between simulation results and real results, and the coincidence value tends to be 1, which proves that the better the simulation effect is, the higher the accuracy of the analysis of the relationship between human resource management activities and performance is [36]. By fusing the association coefficients of each point, the association degree of global contrast sequence $\left\{x_i(k)\right\}$ and reference sequence $\left\{x_j(k)\right\}$ is obtained as follows:

$$r_{ij} = \frac{1}{n} \sum_{k=1}^{i} \xi_{ij}(k). \tag{19}$$

Through the above correlation calculation, we can clearly show the correlation between enterprise human resource management activities and performance.

4. Experimental Design and Result Analysis

4.1. Selection of Experimental Samples. To accurately analyze the relationship between human resource management activities and performance and reduce the loss caused by human resource management crisis, it is necessary to prepare authentic and reliable human resource management data after determining appropriate and comprehensive management indicators, and the selection of such samples will directly affect the final results of risk prediction. As the

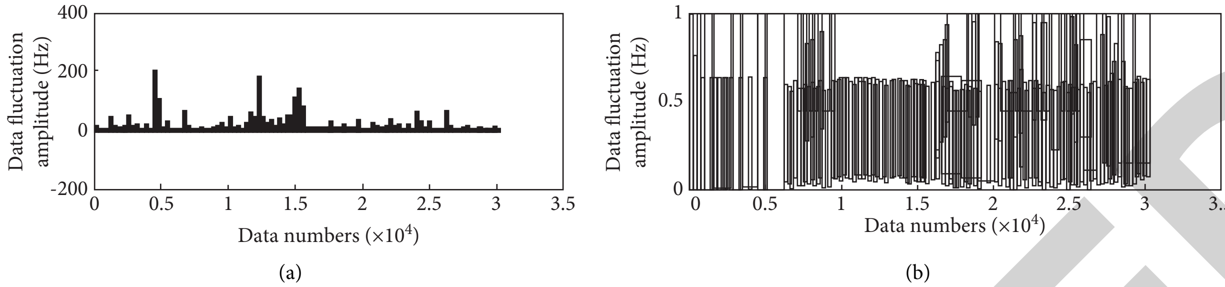

FIGURE 3: Comparison of normalization results. (a) Raw data flow ratio. (b) Normalized data flow ratio.

largest economic and financial research database in China at present, the data in this study all come from CSMAR database, and its accuracy and comprehensiveness include stock market, factor research, company research, character research, bank research, green economy, derivative market, fund market, bond market, economic research, industry research, money market, overseas research, plate research, market information, special research, science, technology and finance, commodity market, and more than 140 sub-databases.

The stock trading of the listed companies is set whose human resource management status or other status is abnormal as ST stock trading, and the enterprises whose human resource management status is in crisis are defined as ST enterprises. Whether a listed company will be classified as a subject of special treatment in the current year is determined by the report on human resource management issued by the listed company in the previous year. If the risk of performance fluctuation under human resource management activities is directly predicted using the report on human resource management issued in the previous year, the prediction accuracy may not be as expected. Therefore, the cross-sectional data from the previous two years of the current year are selected as the experimental sample. Based on the above experimental sample group and experimental group, the sample data are normalized, as shown in Figure 3.

The data normalization results in Figure 3 are used for the following experimental verification.

4.2. Convergence and Application Effect Test of LMBP Algorithm. To verify the convergence of the proposed algorithm, the logistic regression discriminant algorithm and principal component analysis were used as the control group to compare the convergence of different algorithms. The number of experimental iterations is set to 70, and the specific experimental results are shown in Figure 4:

According to Figure 4, compared with the logistic regression discrimination algorithm and principal component analysis method, the proposed algorithm has better convergence. When the number of iterations is 50, the iteration of the algorithm is completed and the optimal result is obtained. The experimental results show that the application performance of the designed algorithm is better.

The LMBP algorithm is constructed, the indexes of estimated samples are brought into calculation, the calculation formulas of principal components are obtained, the original prediction indexes are substituted, and the main program of LMBP algorithm is generated using MATLAB software.

After setting the relevant values, the prediction samples are input, and comparing the obtained prediction correction rate with that of the other two prediction methods, the comparison results of performance fluctuation risk prediction under human resource management activities are shown in Table 5.

As can be seen from Table 5, the prediction accuracy of Logistic regression and principal component analysis is similar, because there is no connection between the two, the results should be accidental, but the forecast value is slightly lower. From the forecast results, the LMBP algorithm is better than the other two methods and can more accurately analyze the relationship between human resource management activities and performance.

4.3. Comparative Analysis of Data Mining Performance. To verify the mining effect of enterprise performance data in this study, the logistic regression discriminant algorithm and principal component analysis are used as the control group to compare the efficiency and accuracy of data in different algorithms. The specific experimental results are shown in Figures 5 and 6.

It can be seen from Figure 5 that the mining time of the three algorithms is greatly affected by the amount of data, and the two are in a positive proportion. However, the time consumption of the data mining method in this study is always lower than that of the literature method. As can be seen from Figure 6, when the amount of data gradually increases, the accuracy of the data mining method proposed in this study is significantly higher than the other two literature methods.

4.4. Comparative Analysis of Mean Square Error of Model. To verify the accuracy of the relationship model between enterprise human resource management activities and performance, taking the average of 400 simulation experiment results as the final experimental results, the normalized mean square error of the model is obtained, as shown in Figure 7.

As can be seen from Figure 7, in comparison, the mean square error of the designed enterprise human resource management activity and performance relationship model is

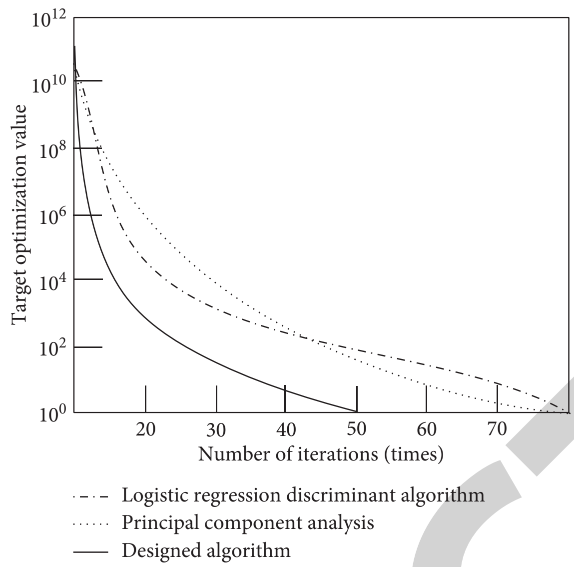

Figure 4: Comparison of convergence of different algorithms.

Table 5: Summary and comparison of performance fluctuation risk prediction under human resource management activities.

Name	ST company (%)	Non-ST company (%)	Total (%)
Logistic regression discriminant	88.58	84.00	86.29
Principal component analysis	88.57	85.00	86.79
LMBP algorithm	85.82	82.67	94.25

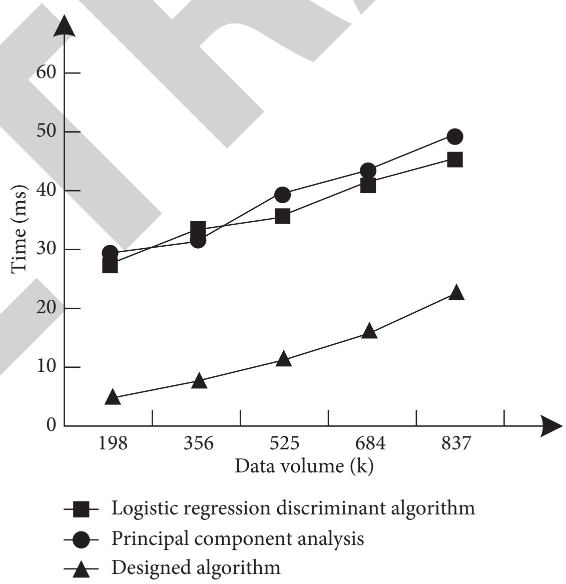

Figure 5: Time-consuming comparison.

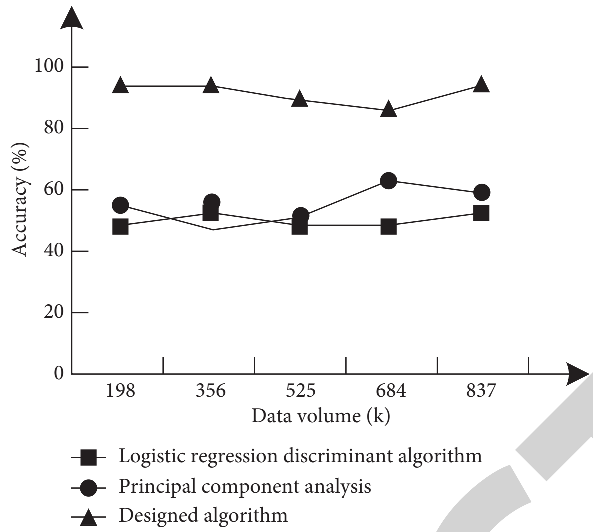

Figure 6: Accuracy comparison.

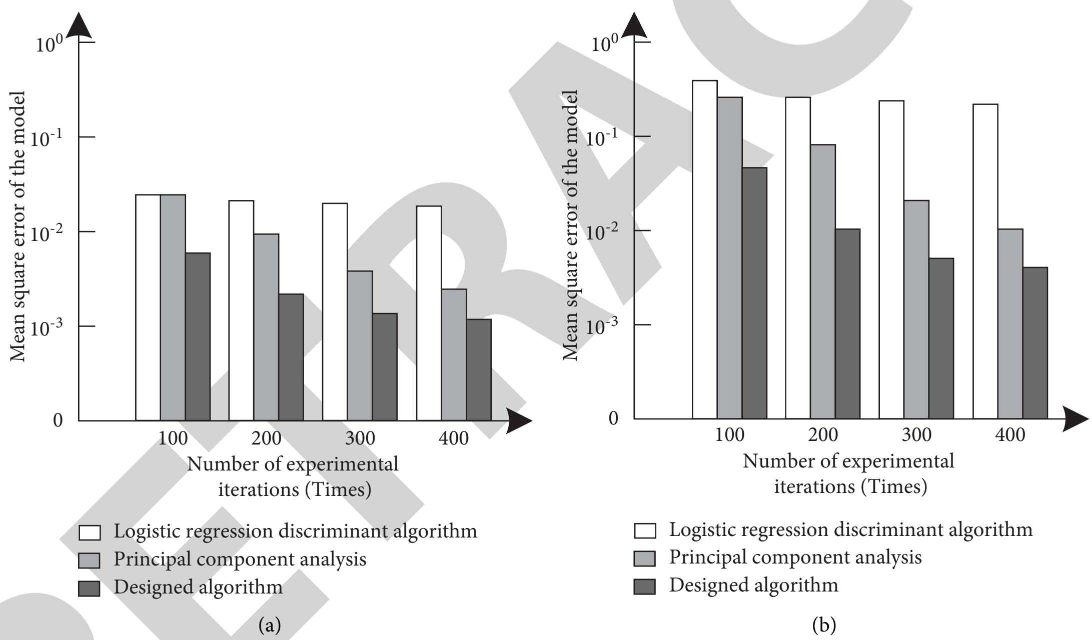

Figure 7: Comparison of mean square error of model. (a) The interference bandwidth is 30 kHz. (b) The interference bandwidth is 50 KHz.

small, indicating that the constructed model can more accurately analyze the impact of enterprise human resource management activities on enterprise performance.

5. Conclusion

To optimize the relationship between enterprise human resource management activities and performance, the LMBP algorithm is applied to predict the performance fluctuation risk under enterprise human resource management activities, and combined with grey correlation analysis, the relationship model between enterprise human resource management activities and performance is constructed. The experimental verification shows that the model can more accurately analyze the relationship between enterprise human resource management activities and performance.

In view of the possible limitations in the research, it is suggested to continue in-depth research in the future, which can be carried out from the following aspects:

(1) Try to adopt the method of random sampling and expand the number of samples to have higher external validity of the research results. Through the effectiveness variable as the intermediary variable of enterprise performance, the mechanism of the impact on enterprise performance is simplified to a certain extent, and the effect of regulatory variables is fully considered in this process.

(2) Conduct in-depth empirical research on specific industries. On the one hand, it can make the research more detailed and in-depth, and design performance variables that can better reflect HRM efficiency and technical efficiency according to specific industry characteristics. On the other hand, it can strengthen the development of intermediary variables. It is also convenient to analyze the mechanism of the impact of HRM on enterprise performance, select specific industries, especially those with high overall quality, and cooperate with relevant government departments or industry associations.

Data Availability

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Conflicts of Interest

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

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