Security and Communication Networks

Secure and Credible Neural Network in Mobile Computing

Lead Guest Editor: Liping Zhang
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Contents

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Research Article

Impact of Digital Transformation of Engineering Enterprises on Enterprise Performance Based on Data Mining and Credible Bayesian Neural Network Model

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Enterprise performance's path choice is impacted by DT (digital transformation). However, from the standpoint of the digital economy, there is currently a dearth of research studying the effect of DT on company performance. The rise of big data technologies makes it feasible to collect comprehensive and objective information. In order to do this, we suggest a new forecasting technology that fully utilises DM (data mining) technology to implement the forecasting process, processes the enterprise's quantitative financial index data, and creates a model. The enterprise performance is forecasted by the reliable Bayesian neural network model of the innovative project portfolio, and the logic of the model architecture is demonstrated. The findings demonstrate that as sample numbers rise, the average accuracy of training samples gradually drops while the average accuracy of test samples gradually rises. The average accuracy of training samples is 0.726, while the average accuracy of validation samples is 0.652 when there are 150 samples. The analysis of the results demonstrates that this study successfully integrates DM into the corporate performance prediction model.

1. Introduction

At present, the scientific and technological revolution has been carried out rapidly, and certain achievements have been made, among which the digital information technology has accelerated its breakthrough. DT (digital transformation) of enterprises is the foundation of digital economy. Accelerating the development and construction of digital economy and continuously promoting the integration of real economy and digital economy has become a hot spot in the market [1]. Engineering is an important part of China's economic development, and its degree of development directly determines China's economic situation. Nowadays, digital economy has been integrated into the daily activities of modern society, and DT has become a challenge that enterprises must face and a threshold that they have to cross. Nearly all business types, across all industries, see creative projects as crucial to the expansion of their companies. Product maintenance and technical upgrading, which users could previously carry out on their own or through other service organizations, became increasingly difficult to carry out with low cost and high efficiency, forcing them to rely on the expert services offered by product manufacturers to resolve issues. This was due to the deepening product complexity in engineering enterprises, which was hampered by the high degree of product specialisation.

The future market is global, and because it is global, consumers need to acknowledge and support it. China has released a number of regulations and legislation to safeguard the future of China's building machinery with national coercive force in order to increase market competitiveness and long-term consideration. In order to increase the financial income of businesses, it is imperative that all departments comprehend the true wants of clients and develop and sell things with this perspective in mind. By encouraging the intelligent upgrading of businesses and completing the

DT, Chinese engineering companies can accomplish the transformation of old and new kinetic energy and advance towards a stage of high-quality development. Under the tide of digital economy, digital technology gives engineering enterprises a great opportunity to innovate and upgrade [2]. Service innovation has broken through the traditional strategic logic of product innovation relying on technological development, and under the competitive logic of service-led competitive paradigm and customer value as the core, it has become an important strategic goal of engineering enterprises [3]. Therefore, more and more managers try to endow the supply chain with higher digital performance through the extensive use of digital technology.

To achieve in-depth mining of information with high value and potential value, DM (data mining) technology must be applied. DM can be seen of as a collection of various complex mathematical models, techniques, and systems. However, there are currently only a small number of publications on the effect of DT on enterprise performance from the perspective of the digital economy. Thus, the study of the DT of engineering enterprises in this paper is beneficial for providing relevant departments with empirical evidence in the microfield to further improve the digital economy policy. Next, relevant departments are urged to establish a full set of DT policy-oriented system to provide guidance for the DT and upgrading of manufacturing enterprises.

The innovation of this paper is mainly reflected in two aspects:

(1) The effect of DT on business performance is examined in this research. Based on the already available research on the financial effects of big data application, intelligence, and networking, it shows the trajectory of the influence of DT on business performance.

(2) In this paper, a performance prediction method of innovative project portfolio based on Bayesian network and PLS is proposed. It not only expands the application of Bayesian network in performance prediction, but also provides decision support for innovative project portfolio management of enterprises.

2. Related Work

2.1. Research on DT of Enterprises. DT is the future development direction of manufacturing enterprises, and it is also an inevitable trend. Digitalization will make people's lives change dramatically, and then transform into a new way. Ng and Yee believe that digitalization aims to improve the operational status by using advanced digital tools, including data analysis, cloud computing, artificial intelligence, and other industries [4]. Chen and Metawa found that the relationship between DT and business process management is inseparable [5]. According to Saeidi et al., the general trend of global industrial reform and the key to boosting overall national strength is reshaping the value chain structure of traditional industries, enabling traditional industries to be equipped with advanced science and technology, and then bringing new growth vitality to generate [6].

According to Chaillet and Dumont the use of digital technology can improve the synergy effect of each operation link within an organization, streamline the entire business process, and increase the effectiveness of the overall management and control, effectively lowering various costs of the organization [7]. According to Liang's perspective, the first stage in a company's DT is to develop its digital thinking culture and extend it to all of its employee's creative ideas [8]. Esau et al. believe that DT can be divided into three stages from low level to high level, namely, information digitization stage, business digitization stage, and digitization stage. These three stages overlap and develop together [9]. Ma et al. think that if an enterprise wants to gain stronger vitality through transformation, it needs to use the Internet thinking mode and integrate digital technology to reconstruct the enterprise from four aspects: business model, capital model, management model, and mental model [10].

2.2. Research on Enterprise Performance. The current business environment is witnessing the emergence of digital innovation and opportunities, which has fundamentally changed the business environment. At the micro level, the DT driven by technological change will obviously affect the management and operation of enterprises, while the application of big data, intelligence, and networking, as different manifestations of digitalization, will also affect the transformation of production and operation modes of enterprises, and then affect the financial performance of enterprises.

Merkestein and Lindeque found that big data has a significant effect on enterprise financial risk prediction, and it is one of the effective ways for enterprise financial risk early warning [11]. Freathy and Thomas studied the relationship between social responsibility of food processing enterprises and enterprise performance from the perspective of social responsibility, and found that food processing enterprises that actively undertake social responsibility can obtain considerable economic benefits [12]. Bradford et al. used PLS (partial least squares) to analyze the financial risks of food processing industry and their impact on small and medium-sized enterprises [13].

Shad et al. used network capability, strategic flexibility, and organizational duality to experiment the relationship between these three factors and strategic performance, indicating that network capability has a substantial impact on strategic performance [14]. Moshesh et al., through perfecting the traditional performance appraisal system, divided the strategic performance appraisal system into several related aspects, and considered that the strategic performance system is a recyclable system [15]. Jones and Williams think that investing in R&D can increase the competitiveness of products and thus improve the company's performance. Compared with those enterprises that do not invest in R&D, the profit rate of R&D investment is nearly 3% higher [16].

Yudianto et al. deeply studied the impact of DT on the production and operation of enterprises and the specific mechanism [17]. It is found that enterprises have changed organizational structure, reconstructed production mode, established a new business model, and broken the previous organizational boundary by using digitalization, which has a significant impact on all links in the closed loop of the whole value chain of enterprises and promoted the improvement of performance.

3. Methodology

3.1. Path Analysis of the Influence of Engineering DT on Enterprise Performance. More and more companies are in a state of rapid growth, and networking also makes the competition among various companies increasingly fierce. Digital technology connects the ending of enterprise activities and all the links in the middle of activities, so that enterprises can quickly respond to market changes, and the better the digital technology, the faster the response speed. The development of enterprises promotes the optimization of organizations. The transformation of organizational structure has promoted the core competitiveness of enterprises. The promotion of organizational structure transformation on the performance of enterprise groups has been significantly strengthened.

Digital economy is a brand-new system, which transforms the economy and politics in society into a new situation. The borderless nature of the Internet effectively accelerates the global industrial transformation and flattens the organizational structure, which is conducive to the interaction and transmission of information. On this basis, the digital economy also derives the characteristics of economy, inclusiveness, and sustainability. DT is a typical change in the era of digital economy [18, 19], which creates a goal-oriented business model by contacting the core business of enterprises. Enterprises can try to collect data through DT, and use digital methods to increase communication and contact between enterprises, so as to share information. It provides timely, accurate, and intuitive data for production managers. Moreover, enterprises are increasingly relying on "cloud services." Cloud services provide a steady stream of power for enterprises, which is a necessary condition for enterprises to survive in the digital society. It will also make full use of data to do market and customer research.

The research of DT and effectiveness belongs to the category of strategic management research, and the related theories of strategic management constitute the basic theoretical basis of the research, which has reference significance for the research of enterprise digitalization. Physically, the resources owned by enterprises can be divided into three categories, namely, tangible resources, intangible resources, and capabilities. By using these resources, enterprises can develop and form competitive advantages. From the perspective of the environment itself, high environmental complexity will increase the speed and frequency of enterprise strategic change. From the perspective of the enterprise itself, the higher the openness of the enterprise, the higher the environmental exposure, the more complex the environment it faces, and the greater the disturbance of the environmental uncertainty to the enterprise operation. The technical level pays attention to the characteristics of technology itself and the relationship with the organization, which affects the adoption process of the organization. The organizational level describes that some elements of the organization will affect the adoption of innovative technologies. This paper selects variable R&D intensity and digital investment as technical factors, endogenous financing capacity, enterprise scale and knowledge, technology intensity as organizational factors, environmental complexity as environmental factors, and constructs a research model (see Figure 1) that affects the DT and effectiveness of enterprises.

The success of the DT of the supply chain of an enterprise depends on its environment, and the digital environment is the premise of the organization's DT of the supply chain. DT of supply chain requires not only a clear digital strategy, but also digital organization and culture. Organizational culture is similar to the attitude of employees. If the established culture is unwilling to change, the result will be a split organization. Intelligent operation focuses on the ability of enterprises to obtain useful information from massive data, which can effectively provide the basis for enterprise decision-making, continuously improve customer experience, strengthen current core business, make full use of information flow, logistics, and capital flow to realize efficient cooperation among supply chain members, improve the visualization and agility of supply chain, effectively respond to the rapidly changing market environment, minimize inventory, and effectively reduce costs [20].

The introduction of numerous digital platforms has reduced the time required for gathering, classifying, analyzing data and information, increased information transparency, decreased information asymmetry, and encouraged the integration and utilisation of resources. Through in-depth data analysis, businesses may communicate with customers more effectively with the aid of corporate digital platforms, create a productive window of communication with clients, offer them a novel consumption experience, and raise customer happiness. The effectiveness with which business funds are used is increased, the ability of accounts receivable to be collected, and concurrently, the turnover rate, profit rate, and enterprise development are all accelerated by the corresponding fixed assets, such as inventory. In order to encourage the sharing of data between the supply chain's upstream and downstream nodes, the supply chain must possess sufficient data processing capabilities to mine user data, comprehend user wants, direct businesses to carry out innovative activities, and deliver individualised services. It is clear that the DT of the supply chain can not only guarantee the quality of goods and services, but also successfully save costs. It can also quickly adapt to the environment of the market, which is changing at a rapid rate, and enhance an organization's ability to provide goods.

3.2. Enterprise Performance Prediction Based on DM. Among the components of quality cost, prevention cost, appraisal cost, and external quality assurance cost are inputs

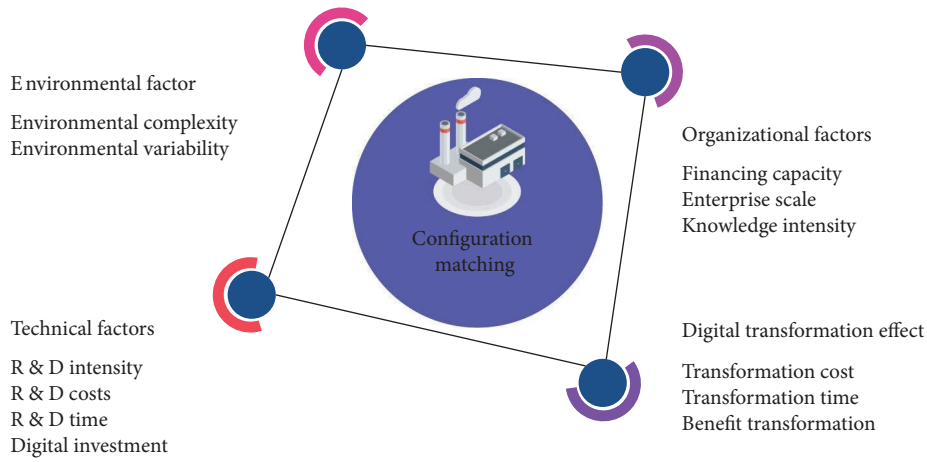

Figure 1: Research model of driving factors of DT.

to ensure product quality, which can be classified as quality assurance cost. This kind of cost input is the premise of reducing quality loss, increasing quality income and improving the competitiveness of enterprises. By measuring the present value of the company's future cash flow and considering intangible assets such as ownership and goodwill, the company's performance can be reflected more comprehensively. By analyzing the value chain of an enterprise, the key achievement areas and key performance evaluation indicators of the enterprise can be determined, and through layer-by-layer decomposition, a three-level key performance indicator system of enterprise, department, and post can be formed.

For engineering enterprises, it is a key asset to "own" the customer interface through their own service organizations. Engineering enterprises can have a deeper understanding of customer's purchasing center, membership relationship, internal policy situation, etc., through representatives of service organizations who frequently contact with customers, and then put forward customer solutions that match customer's real needs. First-line service employees implanted in the customer's site work together with customer employees to establish friendship, share knowledge, and exchange information in the process of solving problems together through frequent communication and long-term interpersonal interaction. This behavior mode can meet the needs of long-term stable relationship between engineering enterprises and customers, and can support the implementation of service strategy of engineering enterprises. However, if engineering enterprises want to create customer value through service transformation, they need to understand the process, resources, and practice of customer management. Therefore, when implementing the customer-centered service strategy, engineering enterprises tend to choose the behavior mode of employee implantation to support the realization of the strategy. Accordingly, it is likely that equipment implantation will not be adopted because it is difficult to grasp the information of customer's whole operation process.

In the field of retail trade, the classification algorithm can classify and personalize the customers by classifying and counting the data of commodity sales and customer's purchasing power in various regions, thus making the distribution strategy of stores more targeted. At present, there are many mathematical structured models for association rule algorithms, which can be classified according to their application objectives, and can be divided into sequence association model, quantity association model, causal association model, and so on.

The following is a definition of the dynamic neighbourhood radius adaptive density's attainable distance:

$$R_A = R\frac{A_i}{A_{i+1}}, \tag{1}$$

where R stands for the starting density's attainable distance, and A_i and A_{i+1} stand for the density values of two sequentially determined cluster's density attraction sites. Let $S[X]$ be the set of N data sets $t_1, t_2, \ldots, t_N$ projected to the attribute set X. The distance measurement formula of $S[X]$ is as follows:

$$d(S[X]) = \frac{\sum_{i=1}^{N}\sum_{j=1}^{N}\delta_X\left(t_i[X], t_j[X]\right)}{N(N-1)}. \tag{2}$$

The tuple distance is indicated by the letter δ in the formula above. The variance of its projected data set to attribute set X increases with increasing distance from $S[X]$. The fuzzy c-means algorithm, which is an extension of the K-means algorithm, is based on fuzzy set theory. It is an approach to data clustering that relies on objective function optimization. Currently, this method is frequently utilised and quite well-liked. Flexible fuzzy partitions, such as the FCM technique, are best suited for grouping data sets with ellipsoidal distribution. If a certain k-itemset is called frequent itemset, the minimum weighted support degree is $w\min\_\sup$, to meet the following condition:

$$\left(\sum_{i_j \in X \cup Y} w_j\right)\sup(X \cup Y) \geq w\min\_\sup. \tag{3}$$

If the association rule $X \Rightarrow Y$ is interesting and $X \cup Y$ is a frequent itemset, then its confidence is not lower than the lowest confidence threshold $w\min\_\sup$.

We calculated the weighted fuzzy support degree $\mathrm{WFSup}(R_{ik})$ of each fuzzy partition item.

$$\mathrm{WFSup}(R_{ik}) = \frac{\sum_{i=1}^{n}\left(w_{ijk} \times \mu_{jk}^{(i)}\right)}{n}. \tag{4}$$

We arranged all fuzzy partitions R_{ik} according to the weight w_{ijk} from big to small, and generate candidate 1-itemset C_1.

In the association rules, the support degree of Y derived by X represents the ratio of X and Y in all records, and the formula is as follows:

$$\mathrm{Support}(X \longrightarrow Y) = \mathrm{countt}\frac{(X \cup Y)}{|D|}. \tag{5}$$

Whether they want to enhance the competitiveness of enterprises, expand the scale of enterprises or get rid of the risk of wearing hats, they are all undergoing DT. At this time, it is very important for them that the performance after DT can be improved. Therefore, we put forward a new forecasting technology, that is, making full use of DM technology to realize the forecasting process, processing the quantitative financial index data of enterprises, and establishing models, so as to provide timely and efficient forecasting support for enterprise managers. The specific process is shown in Figure 2.

We used the method of adding a few classes to make the data set in a balanced state. Down sampling, on the other hand, is a state in which the majority sample and the minority sample are balanced by reducing the majority sample. The selection is based on the following considerations: the choice of one or two methods can be compared and analyzed; secondly, the selected classifier has good generalization ability, which is helpful to the improvement of the model. We can easily solve the selected probability of each branch in the new environment. The results are compared and analyzed to determine which model has a relatively high prediction accuracy when dealing with the binary dependent variables. To determine how comparable the test data set and training data set are, we employ the closest neighbour retrieval approach in this process. This method's calculation formula is as follows:

$$\begin{aligned} D_{xy} &= \|x - y\| \\ &= \sqrt{\sum_{j=1}^{n}\left(x_j - y_j\right)^2}, \end{aligned} \tag{6}$$

where D_{xy} represents the European distance between two cases, x and y represents two cases, respectively, j represents the total number of attributes, and x_j and y_j represents the attributes corresponding to the two cases, respectively.

In this paper, parameter learning is used to predict the performance through the Bayesian network model of innovative project portfolio prediction, and then the rationality of the model design is proved. Bayesian network parameter learning refers to the conditional probability of each node variable obtained by learning and training the sample data after determining the Bayesian network structure.

Bayesian estimation is to learn all possible values of parameter θ with prior knowledge under the network structure G and sample set X. Bayesian estimation of the expression for estimating θ is as follows:

$$\widehat{\theta} = \arg\max_{\theta} P(\theta|D, E). \tag{7}$$

PLS is a form of structural equation model, which has obvious advantages in simulating complex causal relationship among latent variables. Structural equation model is widely used in social science research. The learning rate is not a constant and needs to be automatically adjusted in the process of model training. The automatic adjustment formula is as follows:

$$\eta(t) = \eta(t-1) \times \exp\left(\frac{\log\left(\eta_{\mathrm{low}}/\eta_{\mathrm{high}}\right)}{d}\right). \tag{8}$$

In the formula, η_{low} and η_{high} represents the minimum value and the maximum value of the learning rate, respectively, and d is the attenuation.

A cluster C of X on the attribute set should be equal to or less than the density threshold d_0^x and equal to or more than the frequency value s_0, that is,

$$d(C_X[X]) \le d_0^X, \quad C_X \ge s_0. \tag{9}$$

In this process, the prediction function we use is as follows:

$$H(x_i)\arg\max \sum_{i=1}^{T} h_i(x_i). \tag{10}$$

In this way, we can build BaggingX prediction model.

4. Experiment and Results

This paper takes W engineering enterprise as the research object. In order to obtain financial data easily, this paper used SPSS software to analyze the related financial data of this company from 2010 to 2021 and get the relationship between quality cost and enterprise performance. By reading the annual report of the company, the company's official website, relevant industry research, etc., the enterprises that significantly mention the DT field or digital strategy for further confirmation is selected.

The first-hand information is mainly obtained through in-depth interviews. According to the research questions, the interview outline was drawn up in advance, and the members of the research team conducted in-depth communication with the managers of the case enterprises through on-the-spot visits and video conferences. In addition, during the post-processing of interview records, the interview team kept in touch with the interviewees. When analyzing the solvency of W enterprise, the selected indicators are current ratio, quick ratio, and asset-liability ratio as shown in Table 1. Data visualization of Table 1 is shown in Figure 3.

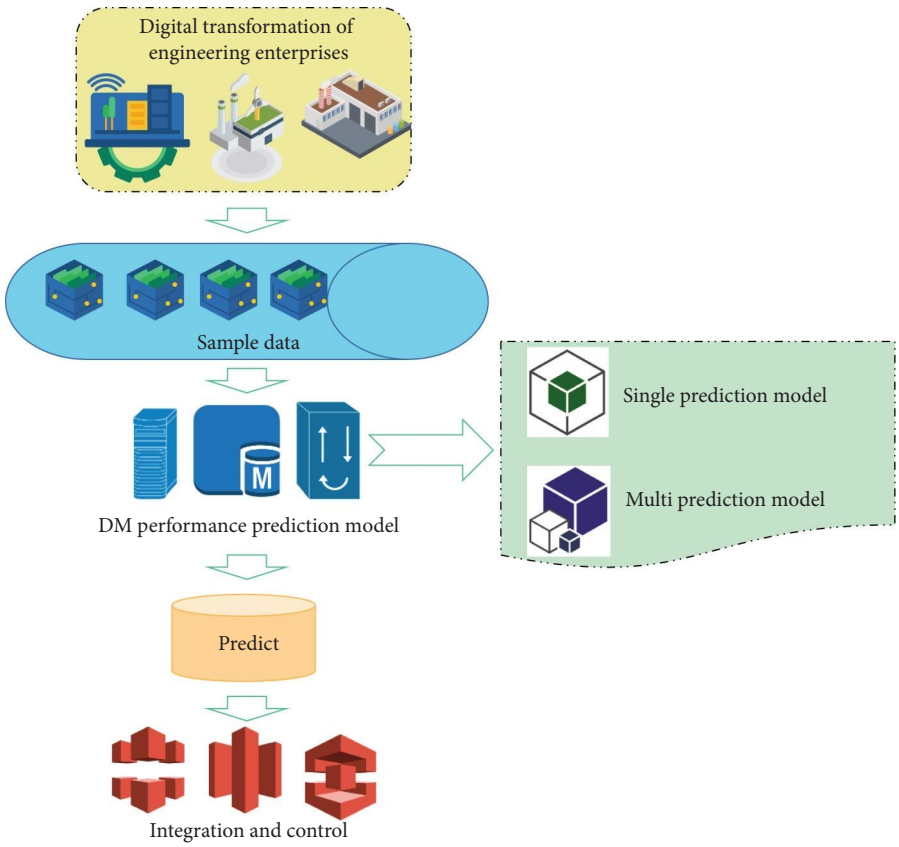

Figure 2: DT performance prediction process.

Table 1: Financial data of W enterprise from 2010 to 2021.

Year	Liquidity ratio	Quick ratio	Asset-liability ratio
2010	3.762	1.199	58.496
2011	1.043	1.23	58.386
2012	3.366	1.156	58.092
2013	3.124	1.044	59.517
2014	1.472	1.127	58.549
2015	2.889	1.22	58.107
2016	3.025	1.094	61.072
2017	2.517	1.187	59.477
2018	4.202	1.033	61.154
2019	1.578	1.031	58.905
2020	2.593	1.154	58.896
2021	2.166	1.252	60.411

It can be found that the turnover ratio of W enterprise before and after the transformation is in a relatively normal range, indicating that the enterprise has strong liquidity. From the perspective of long-term solvency, enterprises have invested a lot of money in introducing talents, R&D costs, fixed assets, etc. According to the data in the table, from 2011 to 2015, the asset-liability ratio of W enterprises was relatively stable, but all of them were in a high position. It also guarantees the company's long-term debt repayment ability.

Taking 2015 as the dividing line before and after the transformation, this paper makes a longitudinal comparative analysis of a number of financial indicators before and after the transformation of W enterprise and preliminarily judges whether the DT has improved the performance of the enterprise, what specific aspects have been improved, and whether the operating conditions of W enterprise have improved during the whole transformation process. Table 2 shows the changes of operating profit margin, gross profit margin, and net profit margin of W enterprise from 2010 to 2021. Figure 4 shows the data visualization results of Table 2.

Compared with before the transformation, the period expense ratio of W enterprises has remained at around 17.3% in the period from 2010 to 2021, and this indicator of W enterprises has been rising year after year since 2017. In

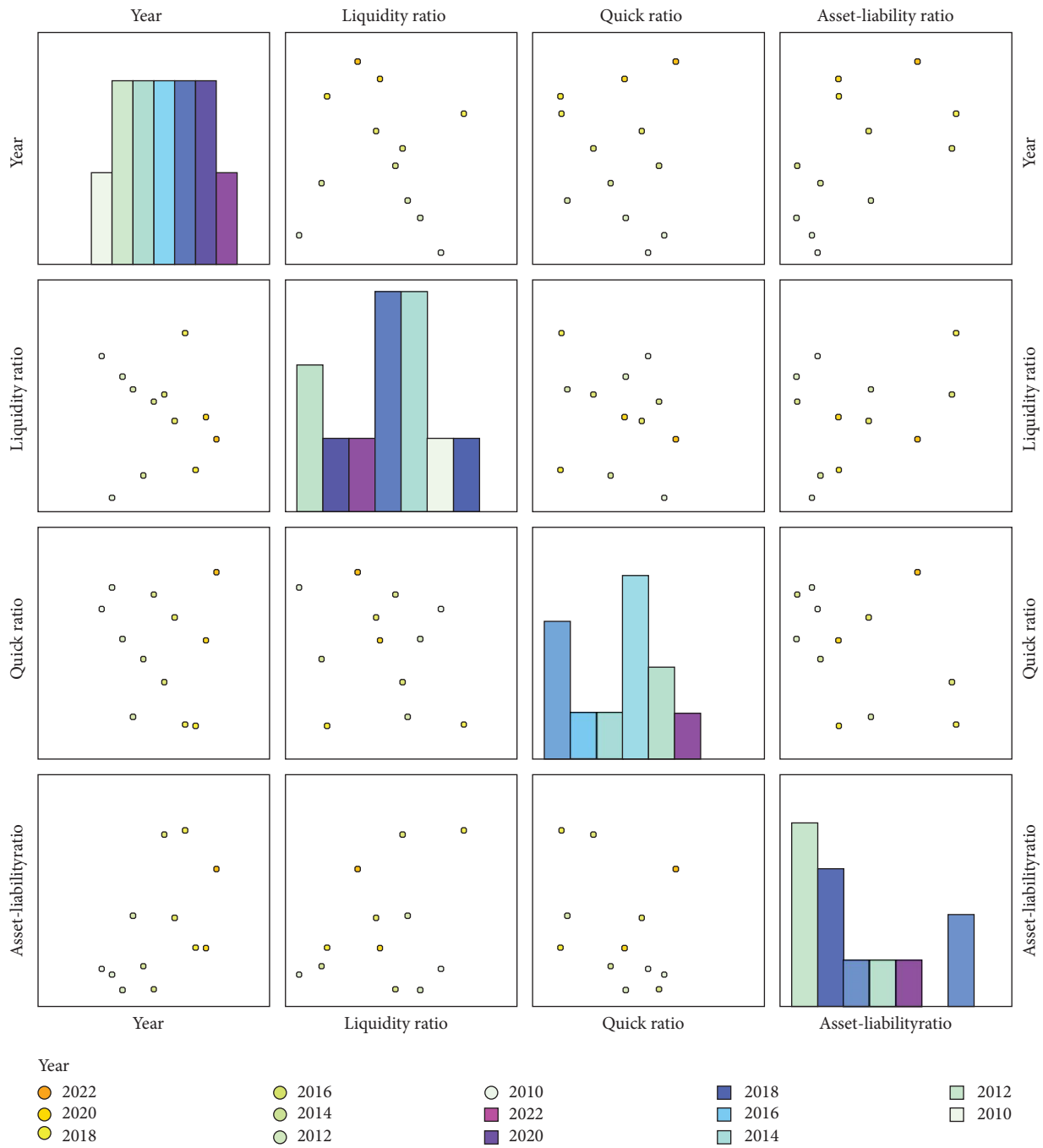

Figure 3: Visualization of flow ratio and quick ratio data.

the whole range, the financial expenses of W enterprise are almost in a state where the interest income is greater than the interest expenditure because of the smooth development of its own financial business. Even if there is a certain amount of financial expenses, its proportion and influence are almost negligible. The company's sales expenses mainly come from product installation and after-sales, advertising expenses, logistics and transportation, and the salary of sales staff, among which the salary of employees is the lowest. DT is characterized by changes and transformations, which are driven and built on the basis of technology. DT of enterprises must rely on technology, and it is changeable and innovative. This paper counts the R&D investment intensity of W enterprises from 2010 to 2021 (see Figure 5).

It can be seen from this that from 2010 to 2021, the R&D expenditure and R&D investment intensity of W enterprises increased overall, especially the R&D investment intensity increased continuously except in 2015, which shows that the independent innovation capability of enterprises is constantly improving and the investment in R&D is also increasing. The measurement data of portfolio performance and its influencing factors mainly come from questionnaire

Table 2: Changes in operating profit margin, gross profit margin, and net profit margin of W enterprise from 2010 to 2021.

Year	Operating profit margin	Gross profit margin of sales	Net profit margin on sales
2010	5.448	17.344	3.713
2011	5.73	17.675	3.571
2012	5.845	17.598	6.62
2013	8.278	20.17	6.421
2014	7.656	21.135	6.197
2015	9.481	21.22	7.044
2016	9.782	24.386	8.659
2017	9.381	23.334	8.279
2018	11.837	23.979	5.24
2019	11.397	27.208	4.992
2020	11.217	27.512	8.598
2021	12.278	27.249	9.182

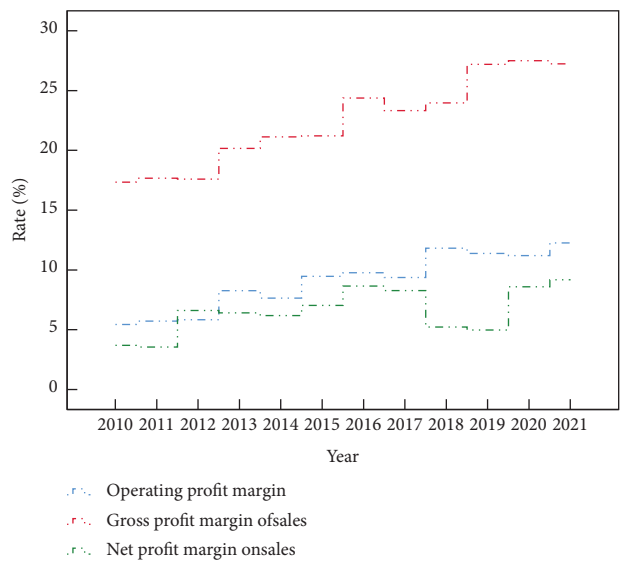

Figure 4: Data visualization results.

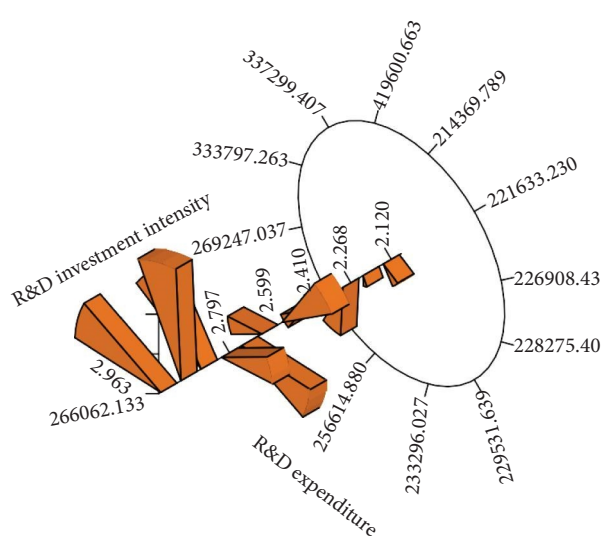

Figure 5: R&D innovation of W enterprise from 2010 to 2021.

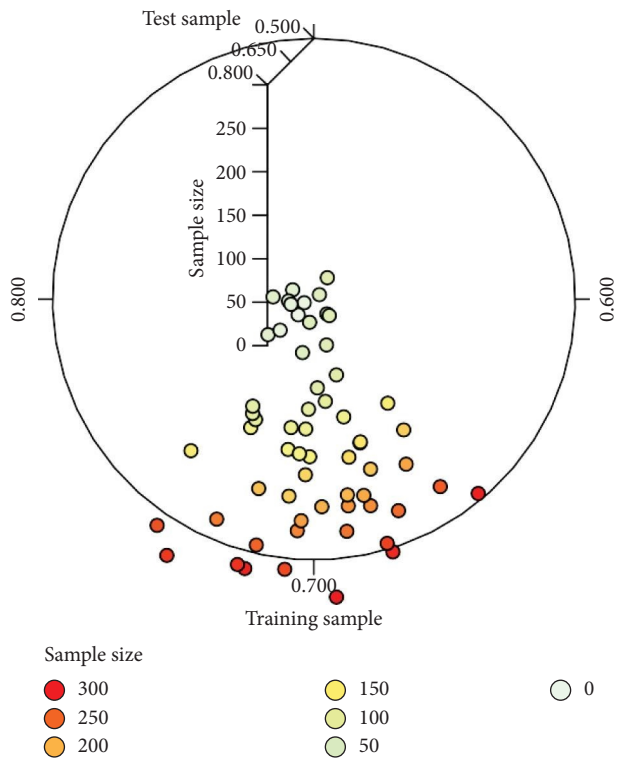

Figure 6: The relationship between the number of samples and prediction accuracy.

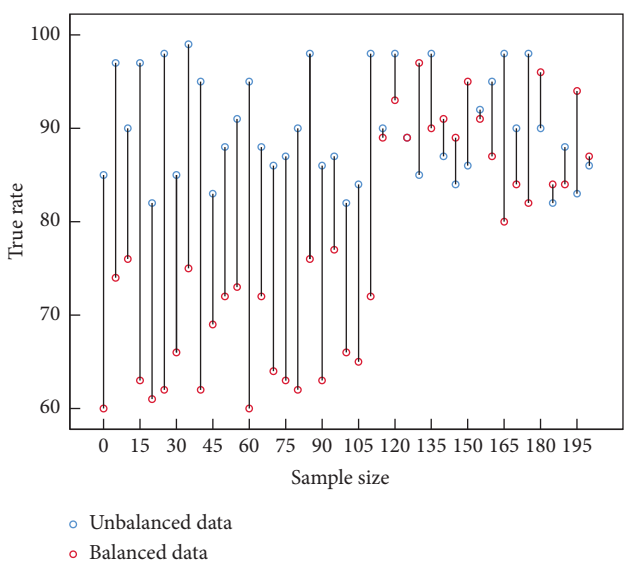

Figure 7: Comparison of real rates of single models.

survey. The more samples are surveyed, the more time, money, and manpower are consumed. As shown in Figure 6.

The average accuracy of verification samples is 0.652, while that of training samples is 0.726 when the sample count is 150. Additionally, sample sizes fewer than 100 will not be taken into account because they cause the Bayesian network optimised by PLS to change in structure. The newly gathered sample data is used as the test set, with the distinction that all previously unbalanced data were used as the training set and that those previously unbalanced data were used as the training set after being balanced, allowing for a comparison and analysis of the two outcomes, as depicted in Figure 7.

Whether it is a single model, a cluster mixed model or a cluster fusion model, the results of each model based on unbalanced data as training set are better than those of balanced data. On the other hand, the result of true negative rate is just the opposite, that is, the balanced data as a training set is better than the unbalanced data as a whole. This may be because the sample of DT failure in the selected research object is small, which makes the results of each model tend to be consistent. Therefore, from the comparison of this set of data, we can see that case-based reasoning and its classifier combined with integration and clustering are more suitable for unbalanced data sets, which not only accords with the actual law, but also has certain practical value. DT has become an inevitable choice for companies. Only by defining the strategic goal of DT of enterprises and fully understanding the existing valuable resources of the company, such as capital, technology, talents, etc., can we find an efficient path suitable for enterprises in the development. The company can achieve the purpose of improving efficiency, organizational management ability, and long-term sustainable development through DT, but the company cannot put all the hopes of improving enterprise performance in the DT, thus ignoring the control of other processes.

5. Conclusion

More and more companies are in a state of rapid growth, and networking also makes the competition among various companies increasingly fierce. In the era of digital economy, DT has become the common choice of most enterprises. Taking W enterprise as an example, this paper studies the path of its DT affecting its performance, and makes targeted optimization suggestions for the enterprise in combination with its own development. In order to support enterprise managers with timely and effective forecasting, we therefore propose a new forecasting technology that fully utilises DM technology to realize the forecasting process. This new technology involves processing quantitative financial index data of enterprises and establishing models. The findings indicate that as the number of samples rises, the average accuracy of training samples gradually declines while the average accuracy of testing samples gradually rises. When there are 150 samples, the average accuracy of the training samples is 0.726 and the average accuracy of the verification samples is 0.652.

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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Research Article

Empirical Compression Features of Mobile Computing and Data Applications Using Deep Neural Networks

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Due to the enormous data sizes involved in mobile computing and multimedia data transfer, it is possible that more data traffic may be generated, necessitating the use of data compression. As a result, this paper investigates how mobile computing data are compressed under all transmission scenarios. The suggested approach integrates deep neural networks (DNN) at high weighting functionalities for compression modes. The proposed method employs appropriate data loading and precise compression ratios for successful data compression. The accuracy of multimedia data that must be conveyed to various users is higher even though compression ratios are higher. The same data are transferred at significantly higher compression ratios, which save time while also minimizing data mistakes that may occur at the receiver. The DNN process also includes a visible parameter for handling high data-weight situations. The visible parameter optimizes the data results, allowing simulation tools to readily observe the compressed data. A comparison case study was created for five different scenarios in order to confirm the results, and it shows that the suggested strategy is significantly more effective than existing methods in roughly 63 percent of the cases.

1. Existing Approaches: A Survey

The fundamental approach to the proposed analytical framework is designed after examining different existing methods that provide support for compression techniques in the mobile computing process. During the analysis process, the state of various representations that are related to data computing is checked, and the drawbacks of various methods are observed. The major reason for examining relevant works in the compression of data is that all drawbacks must be solved using an optimal detection process in the presence of an analytical framework. In [1], the data compression technique is processed using a coding technique where more amount of misperception occurs at input data weights. As the weights are increased, it is essential to check the error function in the compression stage, but at output units, separate error state functions are not represented. Even though adaptive technology is considered, the data compression procedures remain the same as like in encryption and decryption cases thus requiring an advanced methodology. Hence, a survey is made [2] by comparing all the possible techniques for compression, and the values are transmitted using a well-defined wireless network. But to compress the large scale, data wireless networks are not needed as cost-effective function is not assured thus coercing all the mobile computing users to choose identical output units. In order to prevent the identical output units, the data are scheduled with different congregation systems [3]; thus, the compression of individual data is processed in an effective manner. However,

individual data compression will increase the latency, and as a result, the entire time period of computation and storage increases. Conversely, to reduce the cost of data transmission, a common collection unit using a base station is represented with varying size factors.

Apart from data size, the quality of data is also tested using different schemes and types [4] where the data are stored only in the available storage space. In addition, the input bandwidth for compression is much lesser; thus, only valid computing blocks are considered. Due to such deliberations, the compression ratio must be higher for different data computing segments, but in real time, it is not possible to provide high compression ratios. As an alternative, record management systems are introduced [5] with the best computational approach, and better storage space is considered in this type of value selection technique. With the procedure of large storage space, more number of compressed data can be stored and evaluated, thus achieving effective data for encryption. Moreover, an effective tool is chosen to realize all security functions in a mobile computing system with defined standards thus converting all data to be stored in a compact format. Although different data storage techniques are present, it is essential to check the reliability of the data storage process using edge computing procedures [6]. Thus, an initial check is made using edge computing nodes by installing different compression characteristics where compression ratios are made only at tolerable limits. Nevertheless, a standard has been specified for mobile computing systems as the rate of compression; thus, it is not possible to define any threshold value in any time period. Even the method with threshold values undergoes great drawbacks on threshold values, in this case, hybrid suggestions can be made. The aforementioned edge computing process is again carried out as a modernizing tool with robust deep neural networks (DNN) [7] where a mathematical framework is established with several assistance from defined computing devices. As there is a need for a device model, the cost of implementation is increased with the improper deployment of neural networks.

Additionally, the energy Internet model is introduced for mobile computing data compression that incorporates a local area network to compress the basic data that are present in textual representation [8]. The process of using such local networks will cause damage to edge servers; therefore, a random probability technique is made for reducing the percentage of latency in the entire system. It is observed that the usage of random probability increases the margin of compression data with extra overhead points. After changing the selected process to automatic compression, Ada deep neural networks are added thus solving all complex representations of computing nodes [9]. This type of problem-solving method is termed as intelligent systems where the energy of the compression block is greatly improved with clear illustrations. As the clear format of multimedia data is represented, it is necessary to use multiple channels, but at the same time, storage of compressed data in channels must be reduced. Consequently, all major challenges are analyzed using differential equations in order to check the memory processing capability of both compressed and uncompressed blocks [10]. While providing solutions to the big storage unit, a series representation model increases the mass storage of data thus even data clusters are stored during the compression process. Furthermore, many researchers [11] established some models for defining hierarchies to be followed in the case of different mobile devices such as high compression coefficients with limited resource allocation. Researchers have used an improved interframe prediction algorithm for video coding to acquire better-reconstructed images [12]. But the hierarchical model does not provide a structural view with any analytical framework; thus, a separate algorithm is integrated. Even in recent times, the researchers have directed the research model using a deep neural network where the design is completely based on complementary mobile terminals [13–17]. If each terminal in the mobile nodes is stationary, then insignificant data filters will be removed from the system. However, the modernized compression characteristics do not support different data filter types; thus, the recombination of different patterns in filter-based structures is needed. Hence, filter-based structures are changed to quantization aware technique thus evaluating the possible technique of implementing it using recombination states [18]. The state of recombination is provided using residual network data set thus reducing the data size for more number of times. Due to such reduction cases, the accuracy of the entire model is increased with an increase in data errors, and clustered weights do not provide extreme support during this progression period. Thus, to solve all the observed drawbacks, an analytical model is framed, and it is described in Section 2.

1.1. Proposed Methodology. All the existing literature with recent works is based on providing different compression features to applied data in the entire system. But, at the same time, all types of data are not compressed with best output values where even if compression characteristics are applied, data are not transmitted to end users in an appropriate format. It is also observed that compression starts using high weight vectors without any visible parametric variable. Since visible parameters are not added in existing methods, the weight factor increases in exponential terms; thus, compression of data is not provided correctly which directly leads to more storage space and time required for transmitting data is much higher. Furthermore, the distance of data that needs to be computed at different stages is not provided in the case of recently developed techniques, but better compression characteristics are achieved.

Due to the above-mentioned research gap in mobile data, the compression proposed methodology is incorporated with zero compression features. Additionally, visible parameters are added; thus, it is much easier to identify the number of weight factors and compression stages with low computational nodes. Also, the major gap of error minimization is reduced as both input and compressed sequences are compared, and if any mobile computing or data error occurs, it is corrected within an allocated time period. Once the errors are corrected and if the accuracy of corrected data

is higher, then data are retransmitted to the receiver. During the aforementioned retransmission, the latency of compressed bits is measured, and it is necessary that the gain of transmission must be maximized at minimized latency. Moreover, the projected method is applied with deep neural network (DNN) where effective functions are achieved in all three defined units using low data weight representations.

1.2. Objectives. The technique of mobile data compression which is carried out using zero compression units focuses on both minimization and maximization problems and is applied to multiobjectives cases as follows:

(i) To maximize the entire data load, compression of all bits is processed at the same time period with the reduction in input weight vectors

(ii) Appropriate data ratio must be maintained at each node with maximization of data reproduction rate

(iii) The other objective is to reduce the time period of data transfer and errors in data transmission.

2. System Metrics

The major problem that is present in the data transmission technique using a mobile computing system is represented using high data where an analytical model of data is needed for appropriate representation. Moreover, it is necessary to compress the mobile computing data; thus, an analytical framework is framed with high compression characteristics. Most of the system metrics in the existing method are not framed with a proper functioning unit; therefore, the data size that is present at the initial stage is exactly the same even during the channel transmission stage. In order to avoid the above-mentioned circumstance, the mobile computing model is designed with a new storage technique for loading all the compact data bits which can be used at a later stage. This loading technique is represented using equation (1) as follows:

$$l_i = \max \sum_{i=1}^{n} c_b(i) + \tau_i, \tag{1}$$

where c_b indicates the total number of compressed bits, and τ_i represents the optimal bits to be controlled.

Equation (1) is formulated as a maximization function with respect to the objective function as high standard compression is needed. Therefore, the ratio of compression is measured using (2) as follows:

$$r_c(i) = \sum_{i=1}^{n} \frac{u_c(i)}{C_c(i)}, \tag{2}$$

where u_c, C_c indicates the number of uncompressed and compressed bits, respectively.

In order to achieve a better compression effect, it is essential to reproduce all the values which can be represented as reconstructed mobile computing data without any loss of functionality. Thus, the reproduction rate can be expressed using (3) as follows:

$$\rho_i = \max \sum_{i=1}^{n} \frac{CR_i - CR_n}{E_i - E_n}, \tag{3}$$

where CR_i, CR_n denotes the compression ratio of ith and n^{th} bits, respectively. E_i, E_n represents the percentage of error for both i^{th} and n^{th} bits, respectively.

Equation (3) indicates the maximization function where the difference in terms of percentage will be provided. But the compression ratio usually varies with an access point in the case of wireless mobile computing and ad hoc mobile computing; hence, the uplink data rate of computing needs to be formulated using (4) as follows:

$$\text{up}_i = \max \sum_{i=1}^{n} \delta_{\text{in}} \left(1 + \frac{tp_i * g_i}{t_{\text{CPU}}(i)}\right), \tag{4}$$

where tp_i describes the transmission power of mobile computing data, δ_{in} represents the input bandwidth, g_i denotes the gain of the computing channel, and t_{CPU} indicates the time for computation.

Equation (4) represents the third maximization objective function where the users will transmit the data using a local network; therefore, in this case, if both transmission power and bandwidth are reduced, then the compression standard is assured. But the potential characteristics of mobile computing nodes will be different as the latency period is present which is formulated using (5) as follows:

$$\text{latency}_i = \min \sum_{i=1}^{n} \alpha_{\text{trans}}(i) + \alpha_{\text{exe}}(i), \tag{5}$$

where α_{trans}, α_{exe} indicates transmission and execution time periods.

Equation (5) represents minimization function where the latency of compression is not represented. Therefore, compression characteristics of latency are measured using energy values which are represented using (6) as follows:

$$E_i = \sum_{i=1}^{n} \vartheta_i * \text{latency}_i, \tag{6}$$

where ϑ_i represents the power of mobile computing data compression.

If there is more demand in case of compression from different users at the same time period, then mobile computing nodes will undergo an accuracy measurement as represented in (7) as follows:

$$\text{accuracy}_i = \max \sum_{i=1}^{n} D_c - \gamma_c, \tag{7}$$

where D_c, γ_c denotes the decision of classified and true classification representations.

During classification representation, there is a possibility that error functions will be represented as some of the data is highly compressed; thus, more changes are observed. Therefore, the error functions can be represented using (8) as follows:

$$\text{Error}_i = \min \sum_{i=1}^{n} (I_i - \omega_i)^2, \tag{8}$$

where I_i represents computing input sequence, and ω_i denotes compressed sequence.

The complete system model that is described using various parameters and variables is used for multiple objective case studies with minimization or maximization problem where the objective function can be represented using (9) as follows:

$$\text{obj}_i = \min \sum_{i=1}^{n} \text{Error}_i, \text{latency}_i, \max \sum_{i=1}^{n} \text{accuracy}_i, \rho_i, l_i. \quad (9)$$

Both the minimization and maximization problems are not implemented at the same time period; thus, compression characteristics of data are free from errors and latencies at high accuracy values. The entire analytical framework is transformed into a reasonable representation for informal implementation as a loop formation technique. Thus, the converted equation model is integrated with the optimization algorithm which is described in subsequent sections.

3. Optimization Algorithm

Since the data are directly reproduced as a systematic behavior where the human interface is not present in the system, it is necessary to convert system representations that are better unstated by individuals. Therefore, in mobile computing data compression, it is necessary to understand different patterns of input data before and after compression. The varying changes are directly marked in the compressed output; thus, all common problems are deciphered. Therefore, for understanding the computing characteristics in real time, a deep neural network (DNN) is integrated where the major advantage of predicting all complex data patterns is recognized using a three-layer process with a weighting function [19]. If the data in the mobile computing technique are compressed, then more amount of storage space is needed for storing both compressed and uncompressed data, but DNN uses only less memory space in order to store such data computing compressed functions [20–22]. As a result of low storage space, much quicker response is achieved in DNN as multiple layers in the system match both compressed and uncompressed data at same time periods. Furthermore, the resources that are allocated to DNN are much lesser; thus, even for data compression, the mobile computing system is designed at low cost factor. In addition, the number of parameters that need to be computed in DNN for compression measurements can be categorized using three factors that are expressed in mathematical terms using (9) as follows:

$$O_w(i) = \min \sum_{i=1}^{n} \frac{O_{\text{input}}(i) - K_i + P_0}{\mu_i}, \quad (10)$$

where O_{input} denotes input weight functions, K_i, P_0 indicates kernel and zero data compression functions, and μ_i represents number of data compressed pixels.

Equation (9) represents minimization of DNN functions with respect to input weight factors thus making the compression process to be much easier. In case if more weights are represented, then compression of data in the mobile computing process can be processed with a visible parameter which is represented using (10) as follows:

$$\text{weight}_i = \sum_{i=1}^{n} \frac{e^{-v_i}}{N_i}, \quad (11)$$

where e^{-v_i} denotes the exponential factor of the visible parameter.

By using the visible parameter, the compressed output can be expressed as a summation of weight parameters as given in equation (11), and the step-by-step implementation of DNN in mobile computing for compression is deliberated in Figure 1.

$$\text{output}_i = \min \sum_{i=1}^{n} \text{dist}_i + (w_1 + \ldots + w_n), \quad (12)$$

where dist_i indicates the distance of mobile computing data (Algorithm 1).

The process of DNN that is integrated with a defined system model is used for reducing the size of data without any modifications in represented data characteristics; thus, as a result, most of the digital industrial units can able to transmit a large amount of data at short time periods.In industrial process, the concept of big data is applied at both hardware storage capacity and at network bandwidth. The above-mentioned maximization process is provided when DNN is implemented as DNN provides storage space only to required units out of all available units in the system. Additionally, the computing resources are supplied at an appropriate amount even if intensive compression tasks are provided in the system.

4. Results and Discussions

This section provides real-time outcomes for mobile computing data by using some stored data set that is directly moved from cloud systems. At the initial stage, the experimental case studies are carried out using much low size data, and once initial checks are completed, big data are taken into account. Therefore, special compression standards are set for mobile computing data thus making the compression block to function more effectively for both big and small data sets. The data bits that are taken are converted to optimal form where both compressed and uncompressed bits are separated as there is a need to ascribe the compressed bits in case if needed. Thus, the above-mentioned process is carried out using a collection management system (CMS) that provides a better compact for file storage. Furthermore, the type of data that is present for experimental verification deploys both text and image sets using benchmark functions. Therefore, exact outcomes are achieved for defined formulations using a loop function where the programming model is incorporated using a mobile computing tool in MATLAB. Hence, real-time visualization graphs can be observed which makes the user to decide the amount of compression that is needed for further processing by using computing layer techniques. In addition, for examining the

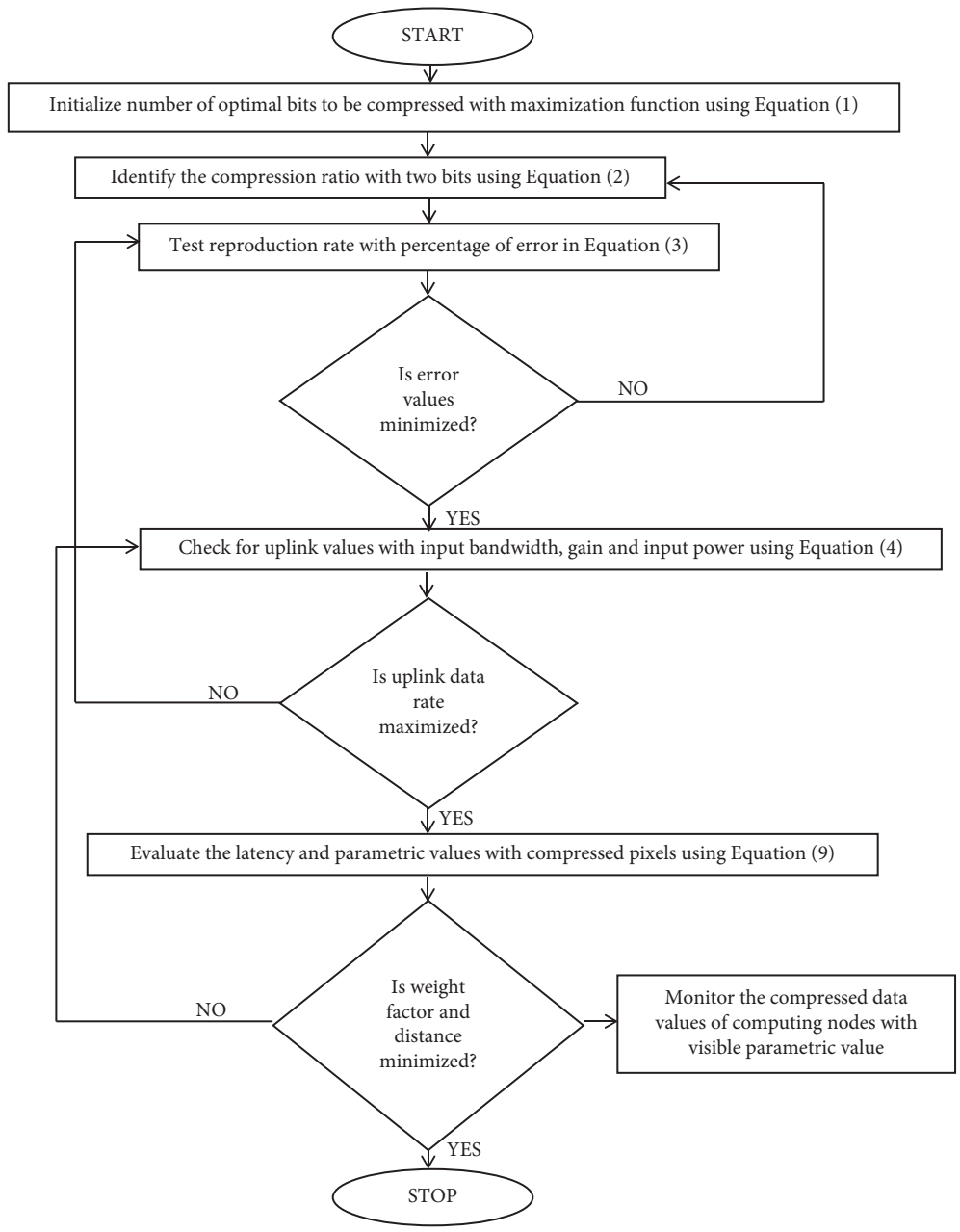

Figure 1: Flow chart of data compression for mobile computing.

outcomes, the proposed method computes the loss results using the defined scenarios as follows:

Scenario 1: analysis of data loading

Scenario 2: ratio of compression

Scenario 3: data reproduction rate

Scenario 4: uplink data rate

Scenario 5: determination of weighting functions

All the above-mentioned scenarios are carried out using lower-level functionalities only at the network layer. Whereas the higher level functionalities are considered in secondary mode only if high compression is needed. But in most cases, higher layer compressions are avoided as the data must be visible to users for more than 65 percentages; hence, more loss of data is evaded in all conditions. The detailed discussion about different scenarios is as follows.

4.1. Scenario 1. The process of loading data directly into the compression block is examined in this scenario where a number of data that are required for compression is also analyzed and stored. One major reason for providing simulation outcomes to this scenario is that more number of bits cannot be occupied in a particular system as the compression stage will take more amount of time for processing data that are present with low data size. Therefore, in the proposed method, only optimal bits are considered thus establishing a compact data compression model. Furthermore, the number of compressed bits is observed and added

Input: Initialize the total number of bits to be compressed with optimal bit representation and maximize the loading units $C_b\,(C_b \le i \le n)$, $\tau_i\,(\tau_i \le i \le n)$ and input weight functions of all mobile computing nodes;
Output: Optimized compressed data pixel values for processing mobile computing data and compressed ratio using deep neural network procedures at much shorter time periods and good expected rates;
Step 1: At first, the objective function is constructed with the uplink data rate using up_i;
Step 2: Initialize the transmission power to multiple data packets for compression with input bandwidth δ_{in} that must be followed by computational time periods $t_{\mathrm{CPU}}\,(i)$ with $0 \le i \le 1$, and its gain values g_i with compression periods of mobile computing process;
Step 3: While $(\mathrm{up}_i < \mathrm{threshold}_i)$ do.
Provide the compression ratio $r_c\,(i)$ in each bits separately for storing uncompressed and compressed data in a systematic way for computing the number of data compression loads in mobile computing automation process by using (2);
Verify the compressed ratio of ith, n^{th} bits and compute percentage of error E_i, E_n with comparison case using compression data separation values by using (3) for identifying the critical changes;
If the uplink data is higher up_i is not at $(\mathrm{up}_i < \mathrm{threshold}_i)$ do
Modify the time and gain for computation using maximization framework as represented using (4) that is having input bandwidth rates δ_i with $1 \le i \le N$ into N number of computing states;
//Weight setup
Update the input weight values $O_w\,(i)$ with kernel values and zero padding measurement function K_i, P_0 by generating the low compressed pixels μ_i using as shown in (9);
//Compressed data measurement
Select the output unit with different weights using distance measurement function dist_i as defined in (11);
Update the information about visible parameters in the computing network using (10) with separate weighting information values followed by the error function representation Error_i and compute the new latency period E_i as defined in (6);
The improvements in minimization of errors are represented using both compressed and input sequence with difference in compressed data which are updated by using (8);
$w_{\mathrm{new}} = w_{\mathrm{old}} + 1$;
End;
Step 4: If $(g_i < 0)$ then
$\mathrm{up}_i \leftarrow 0$; //Interchange the existing solution in the current loop with the new solution;
End if;
Step 5: If $(\mathrm{Error}_i\,[0, 1] < 1)$ then
Re-initialize the compressed mobile computing data with new segments;
Obtain the overall best solution;
End if;
Step 6: If $(g_i < N)$ //Existing solution is replaced with the new solution
$w_i = w_{\mathrm{modified}}$;
$\mathrm{up}_i = N$; //Attain the most feasible solutions for determining the overall best solution;
Increment the count w_i by 1;
Return the best overall solution;
End;

Algorithm 1: Deep neural network (DNN).

with optimal bits thus establishing total data bit representation. This type of bit representation is termed as the control stage as high data bits are converted in an automated manner; hence, functioning units are established appropriately without any data compression error. The total data compression bit values with the loading technique are simulated using Figure 2.

From Figure 2, it is pragmatic that total number of data bits is higher with 10000 to 30000 in varying step sizes of 5000 bits. In the projected method, step size is set as complex due to the incorporation of DNN in the system as some visible data factors are added. Due to much larger data bits, the compression block takes more amount of time for processing the entire data for computing. Hence, optimal data are considered from 3000 to 7000 at varying steps of 1000 bits where data complexity is reduced by removing unnecessary data in the system. After this removal process, compression of the bit period starts with a number of loads where the outcomes at the above-mentioned segments are compared with the existing method [6]. From the comparison outcome, it is observed that the number of loads for the proposed method is maximized with the original data whereas the existing method minimizes the original load data. Thus, at a later stage, compression is performed with less data which are much difficult to handle, and this can be verified with 25000 bits of original data where optimal bits are set at 6000. For the aforementioned data bit, the total load in the case of the proposed system is 3000 whereas, in existing method, it is equal to 2800 bits.

4.2. Scenario 2. In this scenario, the compression ratio of the total number of bits is made using the proper definition standard. The compression ratio in the proposed method is used for reducing more amount of energy in the system as higher data will extract much higher energy than expected.

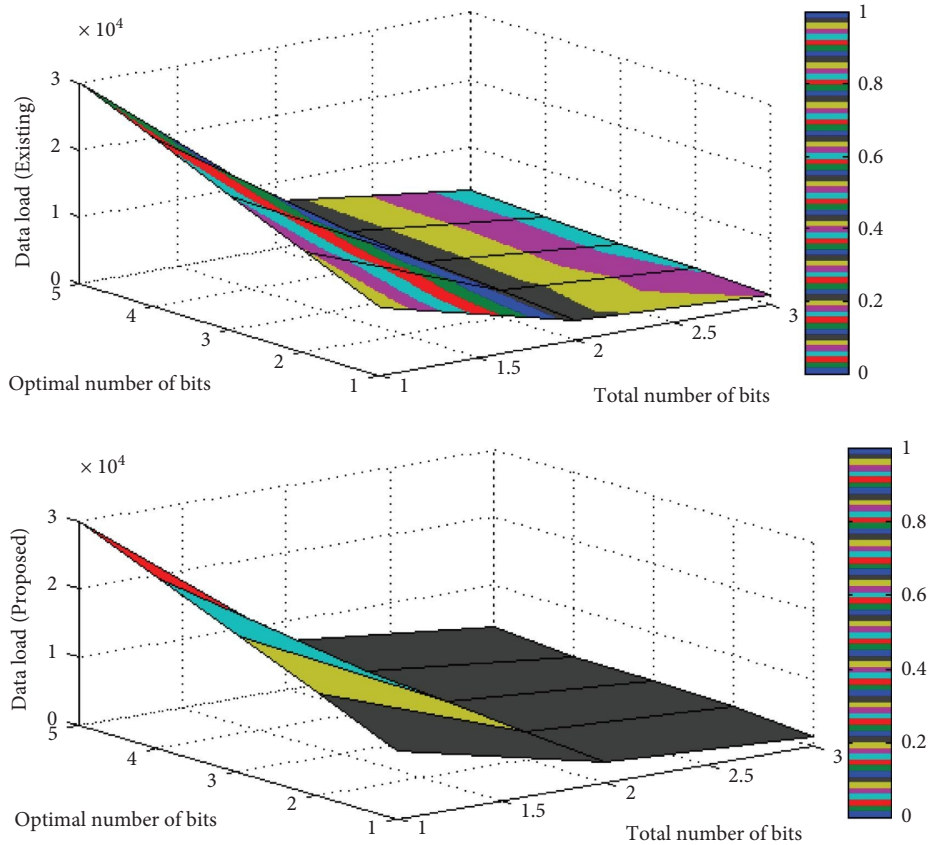

Figure 2: Comparison of data loads.

In many mobile computing systems, it is assumed that data energy is much higher only at the compression stage, but the exact cause is not accurate once the data are compressed. It is obvious that if a system provides more amount of uncompressed data, then the energy for transmission is much higher. Hence, a compression ratio procedure is made in the proposed method where all mobile computing users can transmit the data at low cost and storage. Moreover, the compression ratio is expressed using qualitative terms thus making DNN to function effectively in case of the large data set. In case if proper resources are not allocated for compression, then there is a need to allocate more resource set at the decompression stage. Figure 3 portrays the simulation plot for compression ratio with a comparison case.

From Figure 3, it is observed that a number of uncompressed bits are varied at improper step size as 300, 700, 1300, 1600, and 1900, respectively. Due to more number of uncompressed bits, the factor representation case is made with compressed bits as 100, 300, 600, 800, and 1000, and this stage compression ratio is examined and compared. From the comparison, it is much clear that the proposed method maximized the compression ratio without any data loss as compared to the existing method [6] with low compression values. This can be demonstrated using a number of uncompressed and compressed bits as 1300 and 600 where the compression ratio for the proposed method is 83 percentage which indicates that 1 : 4 data are compressed. But, with the same factor, the existing method provides 62 percentage as compression rate which is much lesser as 1 : 3 data are only compressed with loss of data. Hence, the compression ratio is much better in the case of DNN as compared to other algorithmic cases.

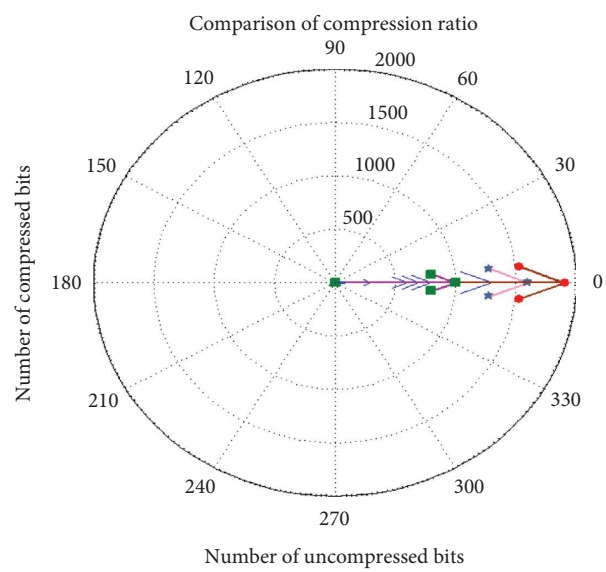

Figure 3: Expression of compression ratio.

4.3. Scenario 3. In real time, it is much difficult to design a mobile computing system that provides high compression with low error conditions. Hence, in the design of the transmission process, the reproduction rate is provided for all bit representation cases. The reproduction rate determines the difference between compressed ratios which are directly separated using percentage errors. Furthermore, this type of reconstructed data avoids high data loss in the system, and this is examined as a new case procedure in the proposed method. In a common mode representation, this type of reproduction rate is termed as normalization technique which is processed using feature extracted data set. But in the projected method, all information sources are parsed; thus, the entire mobile computing system establishes a common arrangement. As a result of common arrangements, multiple objective cases are processed at high computational speed thus maximizing the rate of reproduction at a low computational cost. Figure 4 provides the simulation outcome of the reproduction rate with a comparison study.

From Figure 4, it is realistic that the reproduction rate of the proposed method is maximized as compared to the existing method. For the verification case, the previous case compression ratio is considered in a common mode for both existing and projected methods as 73, 78, 83, 86, and 88 percentage, respectively. During this case, the percentage of error is much lesser as 2, 1.4, 1.2, 0.7, and 0.5, respectively, and with this low error percentage, the reproduction rate of the proposed system with DNN is higher. Even for a high compression ratio, the reproduction rate is maximized to 99 percent thus achieving full data end computing values. In the case of 78 percent compression ratio with 1.4 percent error, the proposed method provides reproduction rate as 98 percentage whereas the existing method provides only 84 percentage as a reproduction rate. Thus, this scenario proves that DNN is capable of reproducing all mobile computing data even at high error representation.

4.4. Scenario 4. The uplink data rate of mobile computing data is calculated in this scenario using transmission power and bandwidth parameters. Furthermore, the uplink data decide whether transmitting nodes provide highly effective operations as every mobile computing data node will be compressed at the transmission phase. Even when the data are transmitted to the receiver, the channel will compress the data; thus, to pass the data to the receiver, it is necessary to have necessary central processing unit time periods. Therefore, the transmission power and gain will be reproduced with separation values of time periods; hence, the compression stage provides a better data rate as compared to other systems. The total separated values are further reproduced using input bandwidth thus reducing the latency periods at both transmission and execution periods. Also, the power of computing nodes must be increased to make the visible parameter reproduced from the entire system; thus, as a result, uplink data are maximized. Figure 5 deliberates uplink data and its comparison with the existing method.

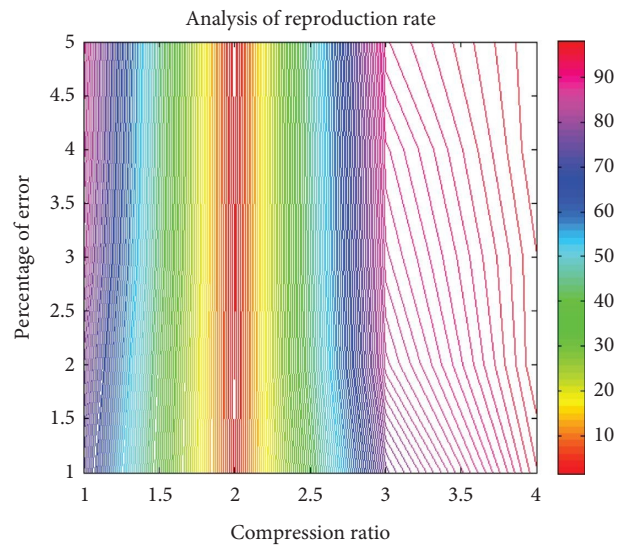

Figure 4: Rate of reproduction.

From Figure 5, it is observed that the transmission power that is provided for a compression block is 2.33, 3.45, 4.67, 5.21, and 6.03, respectively. For given transmission power, the gain of input data that are achieved in the case of full transmission signals is 52, 54, 58, 63, and 65 where time period of the uplink is 3, 5, 8, 14, and 16 seconds; thus, the reproduction process provides maximization of uplink data in the system. Once the initial specifications are completed, then uplink data speed is observed and compared with the existing method [6]. From the comparison, the uplink data that are provided by the proposed method are much higher for all transmitted periods even at a high compression ratio by the transmitter. But with the same data set, the existing method provides much lower uplink data rate, and this can be verified with 5.21 milli watts of transmission power with 63 percentage of gain where uplink data are provided at 17 MHz and 33 MHz for existing and projected methods, respectively.

4.5. Scenario 5. The process of weighting functions is determined in this scenario using kernel and padding parameters. If the computing data are transmitted, then it is essential to provide much low weighting functions to all defined compression blocks. But if the weight of the data is higher, then both accuracy and error will increase; thus, a visible parameter is represented using an exponential function. In addition, the data-compressed pixels are considered as additional weight functions even though it is discarded completely from the system. In case if individual weight functions are increased, then total representation with respect to distance will be maximized. Hence, the proposed method is introduced with DNN to overcome the above-mentioned maximization problem. At the initial stage of compression, only low-weight factors are introduced in the projected system thus making the conversion process to be much easier. Figure 6 provides a simulation analysis of weighting parameters with the comparison case study.

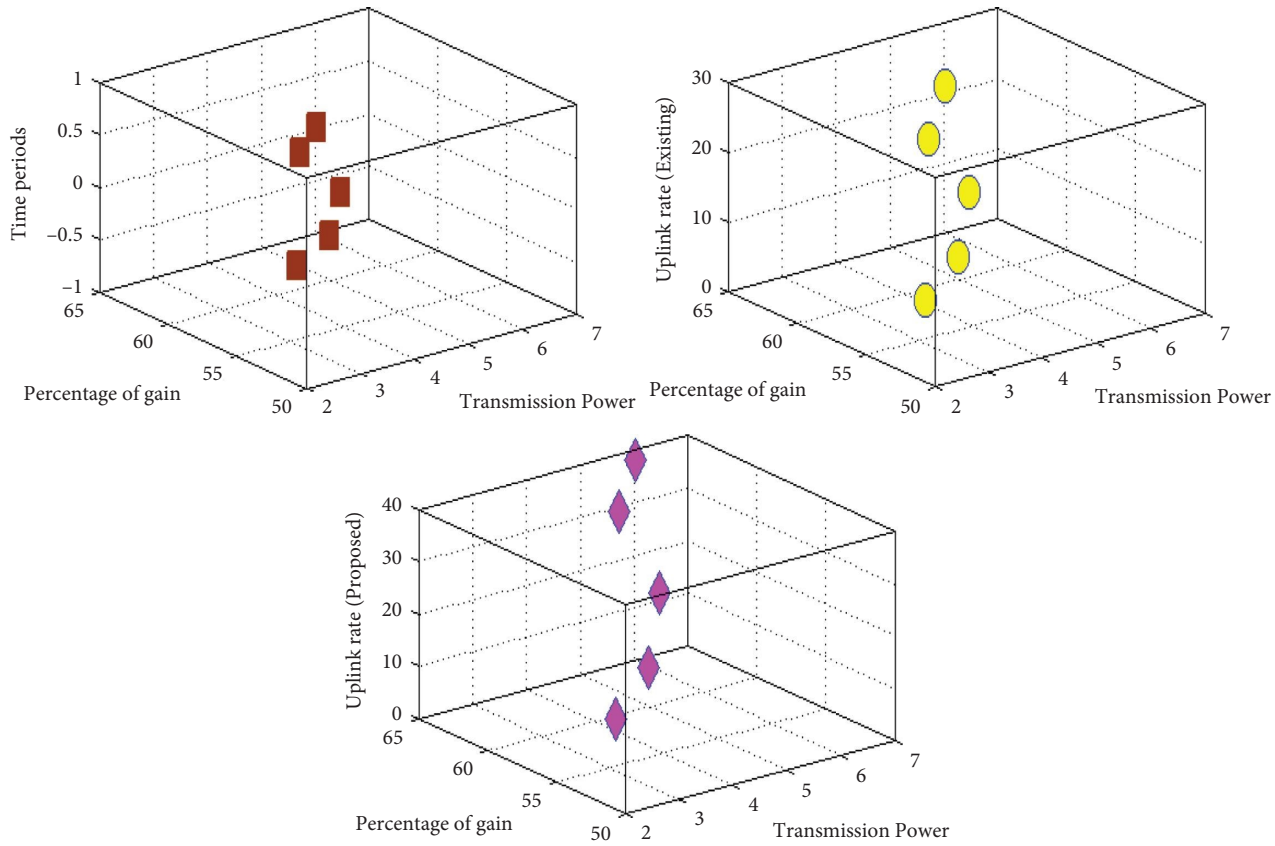

Figure 5: Time periods of transmission.

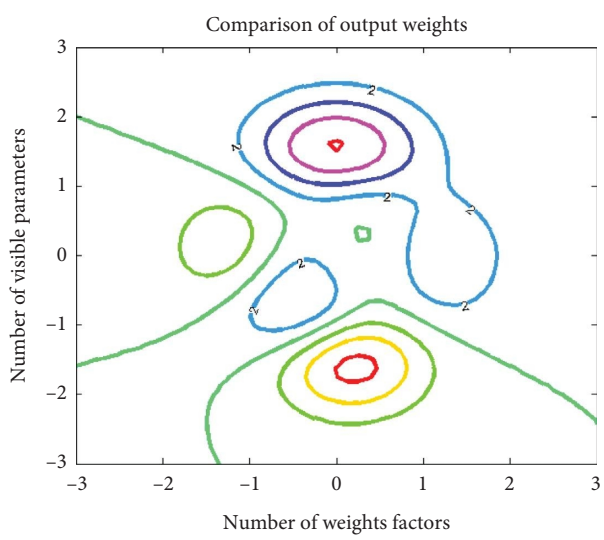

Figure 6: Computation of output weights.

From Figure 6, it is realistic that the number of weight factors is varied in step size of 8 up to 40 units. During this change, a number of visible parameters are varied in step size of 2 up to 10 units where due to this variation, the output units are varied with distance measurements. From the output measurement, a comparison case is made thus making the output unit to be much lesser than threshold values. Also, the existing method [6] increases the weight of the defined function as the distance of computing data is maximized. This can be verified with a weight factor of 24 and visible parameter as 6, and in this input, the weighting data set output unit is equal to 8.54 and 1.75 units for existing and proposed methods, respectively. The above-mentioned big difference in weighting function is due to the incorporation of DNN in the case of the projected method.

4.6. Robustness Characteristics. In the process of mobile compression, foremost importance is provided to the allocation of bits to each mobile node in the entire network. If the allocated bits are much lesser than the original representation values, then compression techniques will be robust as storage required for data during transmission and reception stages is minimized. Furthermore, the data which are converted into useful information must boost the performance of entire network bits, and if it is not achieved in a real-time scenario, then the system is indicated as highly robust, and it cannot adapt to any changes in the network. Additionally, entire system errors must be minimized with low disturbance in network signals; thus, if high deviations are present, then the entire system is highly robust to small changes in network structure. The robustness characteristics of mobile data compression are illustrated in Figure 7.

From Figure 7, it is observed that a comparison case study is provided to prove that the robustness of the proposed method is minimized than the existing approach. This can be demonstrated using ten different iteration values

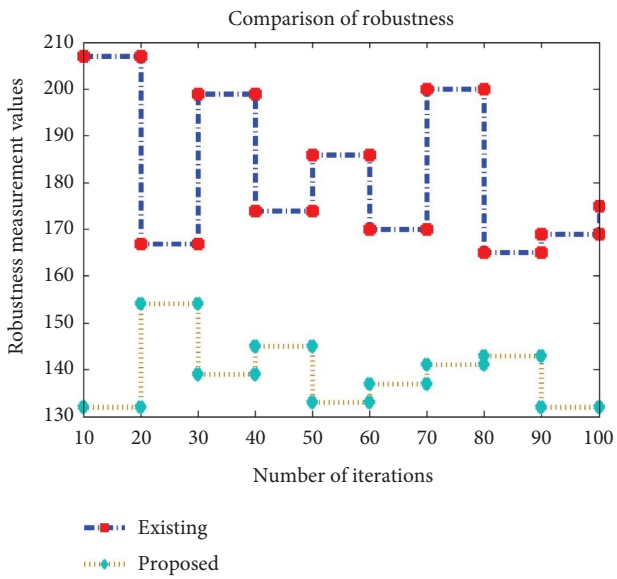

Figure 7: Robustness characteristics.

from 10 to 100 where for each iteration value, the robustness of both existing and proposed methods is provided with the same data set compression measurements. As a result of robust compression measurement, the proposed method minimizes and maintains the same robust values even at high iteration states. This can be proved using iteration periods of 10, 90, and 100 where robustness remains constant in the case of compression terms for the projected approach whereas the existing approach provides the change in robustness values of about 207, 169, and 175, respectively.

5. Conclusions

The problem of compressing high data that is present in mobile computing nodes is solved using DNN with a new analytical model where storage space for computing data is increased. In existing cases, many methods are represented by increasing the storage space of data, but the computing process involved in such cases using video and audio segments is much lesser. Thus, in the proposed method, analytical determinations are made for all common data segments in mobile computing systems with optimal threshold values. The bandwidth of other computing systems are comparatively lesser since the data transmitted in different forms quite often fails to reach the receiver at appropirate time period. But the above-mentioned case is not applicable for mobile computing nodes as data in the computing process are transmitted with low bandwidth; thus, only optimal bits are considered in the representation. Since optimal bits are represented, the compression ratio in the projected model is much higher with the same transparency values in all images. Therefore, as a result, the loss periods are reduced with the maximization of the accuracy factor by implementing visible parameters and weight factor in the system demonstration model. Furthermore, the errors during the data transmission phase are highly reduced as a collaborative server-edge mobile computing model is designed. To examine the integration of analytical framework with optimization algorithm which is carried out using DNN, five scenarios that include a loading of data, compression, reproduction, uplink data rates, and input weight determinations are tested and simulated using MATLAB. Furthermore, the simulation setup is made in real time and compared with the existing approach where the outcomes of the proposed method are much more effective even after data compression for about 63 percentage. In the future, the proposed method can be implemented with better compression standards by modifying the input with additional bits and even high-weight factors can be considered.

5.1. Policy Implications. The major consequences of processing mobile compression using DNN are that in the case of medical diagnostics, it is always required that even if the compressed images are represented in the same quality factor, there is a high-risk factor that small stem cells may be unexploited. Due to unexploited characteristics, the compression features might provide in accurate results with nearly 10 percentage changes in total data that are transmitted to the destination. Even in other applications, the consequence of mobile computing nodes will be highly robust; thus, extreme care must be taken to avoid such type of extreme compression.

Data Availability

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

Conflicts of Interest

The authors declare that they have no conflicts of interest.

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Research Article

A New Model of Environmental-Economic Coordination Prediction Using Credible Neural Network Integration and Big Data Analysis

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Currently, a significant portion of sustained economic growth still depends on a high input of resources. We must fully understand the significance, difficulty, and long-term nature of resource conservation and environmental protection. We must also intensify our efforts to protect the ecological environment. We must gradually form a production mode, lifestyle, and consumption mode conducive to environmental protection. We must also establish a benign interactive relationship with the environment. This study offers a big data analysis and neural network integration optimization design strategy for a new kind of environmental and economic coordination prediction model. The data of the new type of environmental and economic impact with numerous parameters are preprocessed using big data analysis and principal component analysis. A neural network integration system is used to create the prediction model, and prediction research and error analysis are conducted to enhance the new kind of environmental and economic model. The simulation test analysis is completed lastly. According to the simulation findings, the proposed arithmetic has an accuracy that is 8.56% higher than that of the conventional arithmetic. A sustainable improvement management system with environmental objectives, environmental management planning plans, and environmental monitoring systems can be established with help from the new environmental and economic coordination prediction model, which can also assist in predicting the potential environmental impact caused by economic development activities. This will ensure sustainable development as a result of the mechanism.

1. Introduction

With the development of social productivity, while human's ability to use and transform nature to obtain material means of life has increased significantly, the pollution and damage to the ecological environment are also increasing, and the coordination between environment and economy is decreasing [1]. Economic growth and environmental protection are consistent in objectives and interact with each other. Therefore, while economic growth is required, attention should also be paid to the coordination of environmental protection. Environment, an economic system, is a complex system [2, 3]. Four categories can be used to group its components together: population, resources (environment), economics, and technology. The human system, which serves as the core of economics, technology, and environment, has been buried in the three systems, while the environmental system serves as the foundation and the economic system as the major body. The technical system acts as an intermediary between the two. The environment economy system's four primary processes are the circulation of materials, the flow of energy, the transmission of information, and the multiplication of value. The production and reproduction of contemporary society fall within the environmental economy definition of production and reproduction. The total optimization of the environmental-economic system, or the coordinated growth of the environment and economy, must be ensured while pursuing the value multiplication of the environmental-economic system [4]. The goal of the economy-environment coordination

degree is to quantitatively define the degree of connection between the level of regional economic development and the regional environmental carrying capacity at a given stage of economic development. By examining the coordination degree intervals of multiple regions, multiple periods, and various economic development stages, the significance of the research on the degree of economy and environment coordination is to attempt to identify the regular characteristics of the evolution between economy and environment in order to provide reference standards for the development of each region. Theoretically, it can be proved that there is an optimal coscheduling between economy and environment, and the optimal coscheduling is the best combination state of economy and environment that adapts to the stage of regional economic development [5, 6].

Big data can assist people in overcoming sample collection method constraints and realising the collection of all samples, all-weather, all-scene, and all-around data, thereby assisting in improving the predictive capability of economic and social operation entities. Traditional statistics, on the other hand, is primarily based on limited statistical sample data. The new environmental and economic coordination forecast is a significant and intricate piece of work that can give the government, businesses, and other relevant departments a scientific foundation on which to understand future economic operation, assess the pace of development, and create development strategies. However, the model prediction cannot be completed with just large data analysis. In order to improve the structure of the model, it must incorporate some mathematical operations. The goal of neural network integration is to learn the same problem using a small number of neural networks (or other learning systems), and the output of each neural network that makes up the integration under a given input example determines the integration's output under that example. By training numerous neural networks and combining their findings, neural network integration can considerably increase a neural network system's capacity for generalisation. Given the benefits of neural network integration, this research uses the BPNN (back propagation neural network) method to lower the cost of arithmetic execution during neural network integration.

Sustainable development is the active regulation and control of the environment, economy, and society as a whole so that humanity can advance economic progress without going beyond the resource and environmental carrying capacities. To protect the sustainable use of resources and improve the development of living standards, we should not only meet the needs of contemporary people but also not endanger the needs of future generations. It not only meets the needs of people in one region or one country but also does not harm the needs of people in other regions or countries [7]. The human being is a creation of the environment. The process of continuously receiving survival information from the natural environment system in which they exist constitutes the core of human economic activity. It uses the natural environment as the initial stimulus, the medium for delivery, and the setting for the outcome. It falls under the area of interactions between people and the environment. Therefore, economic system and environmental system are unified, and there are many nonlinear coupling relationships [8]. Only by coordinating the relationship between economy and environment can we realize the harmony between human and environment and the sustainable economic activities. The novel environmental and economic coordination prediction model's feature reconstruction model for the optimum design picture is established in this work. Principal component analysis preprocesses the data. The enhanced BPNN math is used to test the prediction model's accuracy, and the fuzzy characteristic of the new environmental and economic impact variables is extracted. It is innovative in the following:

(1) In this paper, the BPNN method in neural network integration is used to reduce the execution cost of the arithmetic.

(2) The big data analysis technology is used to realize the optimised design and identification of the new environmental and economic coordination prediction model in this paper. The key feature quantity of the optimised design image of the new environmental and economic coordination prediction model is constructed.

2. Related Work

Sustainable development has rich theoretical connotation, but when evaluating the sustainable development level of a region, it needs a specific and feasible evaluation statistical index system as a comparative analysis tool [9]. From a macropoint of view, from county and town to province and country, only each level has achieved sustainable development, and the sustainable development of the whole society can be achieved. Therefore, the study of regional sustainable development has high practical significance [10].

Hosseini et al. applied the system method to the analysis of the correlation between environment and economy and proposed the welfare type economic development, i.e., the "spaceship theory," which uses the circular economic system to replace the original linear production mode [11]. The development model of steady-state economy proposed by Varela Santos et al. is discussed from the perspective that economic growth is constrained by environmental resources. It is proposed that the economic structure changes are less and less dependent on scarce resources. As long as the input level in the economy is equal to the external input, the resources can reach the optimal utilization rate [12]. Liu et al. compared the commonly used models by studying the relationship between population, consumption, production and other factors and the environment and found that the basic core and structure of each model are roughly the same [13]. Ifaei et al. pointed out that "sustainable development" is the fundamental principle to solve the environment and development [14]. Zhou put forward the slogan of "human beings want to survive, the Earth needs to be saved, and the environment and development must be coordinated," putting the environment and human development on the agenda, reflecting the emphasis on the

sustainable development of environmental economy [15]. The system of economy-environment development is proposed by Zhang et al. The various models established by the system include the organic combination of the intrinsic and extrinsic nature of the economy. Its analysis has a predictable effect on the changes of the natural environment and can be considered as a specific factor for the endogenous growth based on environmental factors [16]. Li et al. put forward the definition of the connotation of green development, that is, taking coping with climate change and resource and environmental protection as the logical destination, and mainly emphasized that in the process of economic development, we should pay attention to greenhouse gas emission reduction and strengthen resource and environmental protection [17]. The indicator system of regional comprehensive social and economic development strength of Wang et al. clearly puts forward the connotation of comprehensive social and economic strength of provinces (cities and districts) and gives a set of evaluation indicator system and evaluation methods based on quantitative analysis and combining qualitative analysis and quantitative judgment [18]. Ghosal et al. established a relatively complete sustainable development indicator system and used the multiobjective linear weighting function model to conduct a systematic comprehensive evaluation of the regional sustainable development process for the first time [19]. Mojid et al. used the concept of resource carrying capacity to improve the national sustainable development evaluation index system, used five indicators such as resource carrying capacity to determine the regional sustainable development capacity, and used indicators such as resource abundance to determine the sustainable development status [20].

Few qualitative indicators that reflect the system and policies may be found in the assessment index system of the coordinated development of environment and economy at home and abroad. Even while quantitative indicators are helpful for demonstration, the index system of qualitative indicators for normative research is lacking, and it is also important to talk about how thorough and objective the evaluation results were. This study offers a big data analysis and neural network integration optimization design strategy for a new environmental and economic coordination prediction model. New environmental and economic data are processed, the model is checked for errors, and the prediction model is improved in terms of accuracy and real-time detection, making the model prediction more scientific. This is done using big data analysis and neural network integration.

3. Methodology

3.1. Real-Time Monitoring of the New Environmental and Economic Coordination Model Using Big Data Analysis. The environmental and economic composite system is composed of the environmental system and the economic system. The population and the scientific and technological system are the ties and intermediaries between the two. Through a series of economic and living activities, the economic system and the environmental system are closely linked [21]. The three systems of environment, economy, population, and science and technology are interconnected, influenced, and restricted by each other. They are combined to realize the overall function of the system and promote the coordinated development of the composite system. According to the relationship between the subsystems of the environmental-economic system, the structural diagram of the environmental-economic composite system is drawn, as shown in Figure 1.

As a common arithmetic for data analysis, principal component analysis transforms multiple related variables into a few unrelated comprehensive indicators, simplifies data, eliminates redundancy, and still accurately reflects the original information.

The principal component analysis method realizes replacing the original variables with a few new comprehensive indicators. Instead of directly removing some variables from the original variables, it selects a few new indicators that can comprehensively reflect important information through data processing. The new indicators are called principal components, and there is no correlation and information overlap between the principal components. Multivariable problems occur from time to time. For example, it is necessary to understand more than ten basic indicators such as height, chest circumference, and waist circumference when making a coat. However, in the process of clothing sales, the size selection is usually based on three indicators that reflect the length, fat and thin, and characteristics. This is the meaning of the principal component analysis method, so as to simplify the data structure and describe the information in a more concise and comprehensive manner. Principal component analysis aims to use the idea of dimension reduction to realize the transformation of spatial coordinates and to process the original interrelated information to represent the effective information in a new form independent of each other. Now, the operation steps of principal component analysis are analyzed in depth. Assuming that $x_1, x_2, \ldots, x_p$ is the original variable index, there are n samples, forming a $n \times p$ order data matrix:

$$X = \begin{bmatrix} x_{11}, x_{12}, \ldots, x_{1p} \\ x_{21}, x_{22}, \ldots, x_{2p} \\ \ldots\ldots\ldots\ldots\ldots\ldots \\ x_{n1}, x_{n2}, \ldots, x_{np} \end{bmatrix}. \quad (1)$$

The above original variable data are subjected to the principal component analysis, and the precise procedure is as follows:

(1) The original data were normalized and transformed into effective data between [0, 1].

(2) A sample correlation matrix is made by computing it.

First, the correlation coefficient between the original information variables needs to be calculated by the following formula:

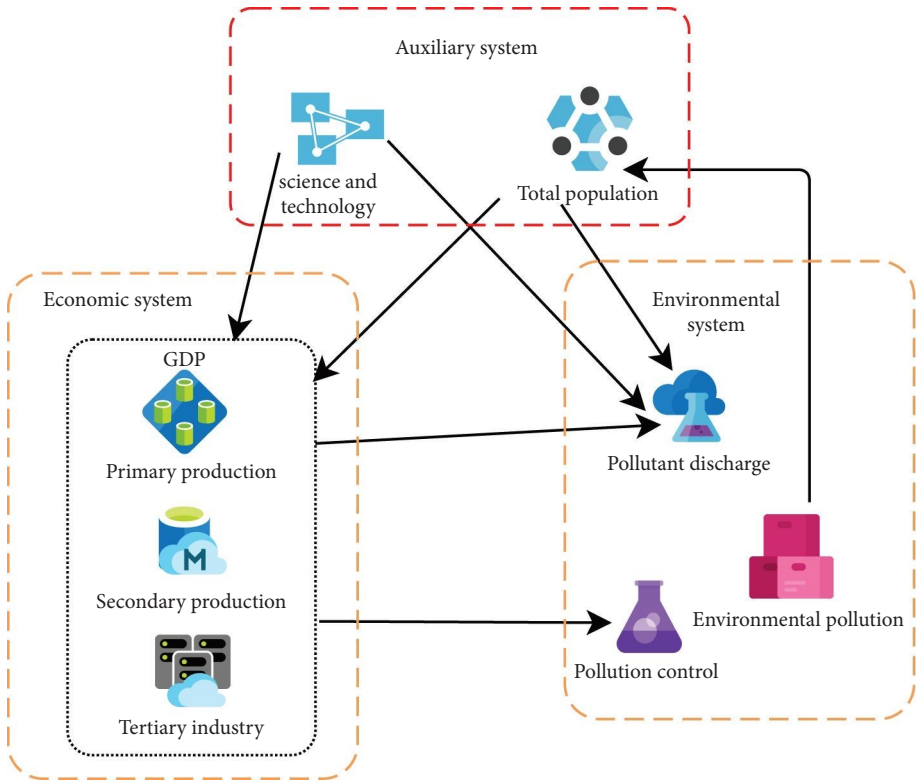

Figure 1: Structure of environmental-economic system.

$$r_{ij} = \frac{\sum_{k=1}^{n}\left(x_{ki} - \overline{x_i}\right)\left(x_{ki} - \overline{x_j}\right)}{\sqrt{\sum_{k=1}^{n}\left(x_{ki} - \overline{x_i}\right)^2 \sum_{k=1}^{n}\left(x_{ki} - \overline{x_j}\right)^2}}, \tag{2}$$

where $r_{ij}\,(i, j = 1, 2, \ldots, p)$ is the correlation coefficient between variables x_i and x_j. On this basis, the sample correlation matrix is calculated by the following formula:

$$R = \begin{bmatrix} r_{11}, r_{12}, \ldots, r_{1p} \\ r_{21}, r_{22}, \ldots, r_{2p} \\ \ldots\ldots\ldots\ldots\ldots\ldots \\ r_{n1}, r_{n2}, \ldots, r_{np} \end{bmatrix}. \tag{3}$$

(3) The eigenvalue is found. The characteristic equation $|\lambda I - R| = 0$ is established and the characteristic value $\lambda_i\,(i = 1, 2, \ldots, p)$ is obtained. A large number of mathematical experiments have proved that the finally selected principal component corresponds to the larger one of the eigenvalues. Therefore, after obtaining the features, it is necessary to sort them in the order from large to small to ensure $\lambda_1 \geq \lambda_2 \geq \ldots, \lambda_p \geq 0$. The eigenvalue solution of covariance matrix is the most important in the process of principal component analysis.

(4) The contribution rates are calculated for the major and cumulative components. The number of principle components that were ultimately chosen must be determined before creating a new comprehensive indicator sample set. The threshold value for the cumulative contribution rate of the primary components, which is typically set to 85%, is normally the approach that is used for selection.

(ii) The calculation formula of each principal component contribution rate PV_i is as follows:

$$PV_i = \frac{\lambda_i}{\sum_{k=1}^{p} \lambda_k}. \tag{4}$$

The calculation formula of principal component cumulative contribution rate APV_m is as follows:

$$APV_m = \frac{\sum_{k=1}^{m} \lambda_k}{\sum_{k=1}^{p} \lambda_k}. \tag{5}$$

(5) A new sample matrix is constructed. Note $z_1, z_2, \ldots, z_m$ is a new variable index, and m principal component components are calculated according to the following formula:

$$\begin{cases} z_1 = a_{11}x_1 + a_{12}x_2 + \ldots + a_{1p}x_p \\ z_2 = a_{21}x_1 + a_{22}x_2 + \ldots + a_{2p}x_p \\ \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \\ z_m = a_{m1}x_1 + a_{m2}x_2 + \ldots + a_{mp}x_p \end{cases}. \tag{6}$$

3.2. Prediction Model Optimization Using Credible Neural Network Integration. The goal of coordinated regulation and control of environment economy system is sustainable development in essence, which can be divided into two aspects.

The first aspect is to achieve rapid economic development on the basis of ensuring good environmental quality and avoiding serious environmental pollution and ecological problems. The second aspect is to reduce the damage to resources and ecology, reduce pollution emissions, and maintain good natural environment quality while the production continues to grow.

In recent years, a lot of research has been done on economic prediction at home and abroad, and many prediction methods have been proposed. Among them, neural network is considered to be a better nonlinear prediction method, especially BPNN.

BPNN can be used to fit any complex nonlinear relationship. The operation process of the whole network model can be expressed by the nonlinear mapping relationship shown in the following formula:

$$F\colon R^{N_1} \longrightarrow R^{N_3},\ G = F(H), \tag{7}$$

where H is the input sample, G is the output, N_1 is the number of input nodes, and N_3 is the number of output nodes. The BPNN arithmetic takes the least square method as the basic idea and adopts the gradient descent method to continuously update the weight and threshold along the negative gradient direction of the error target until the error meets the target requirements. In essence, it is a process of parameter optimization. A multilayer network model is established by means of supervised learning. In the process of network learning, some learning rules are used to adjust and modify the connection weights while the error is back propagated. The connection weights between the network neurons of each layer are modified by the learning process.

The input layer, hidden layer, and output layer make up the BPNN model. While the concealed layer might be single or multilayered, the input and output layers are both single layers. Figure 2 depicts the BPNN's construction, which includes numerous buried layers.

The creation of individual networks and the integration of the outputs of many neural networks are the two main problems involved in credible neural network integration.

Each neural network is given a weight of k_T to meet the following requirements:

$$k_T > 0,\ \sum_T k_T = 1. \tag{8}$$

The training set is accumulated and extracted from the distribution $p(x)$. Assuming that the output of the network T is $V^T(X)$ for the input X, the output of the neural network integration is

$$\overline{V}(X) = \sum_T k_T V^T(X). \tag{9}$$

The following is a definition of the generalisation error of credible neural networks and neural network integration:

$$\begin{aligned} &E^T \int \mathrm{dxp}(x)\left(f(x) - V^T(X)\right)^2, \\ &E \int \mathrm{dxp}(x)\left(f(x) - \overline{V}(X)\right)^2. \end{aligned} \tag{10}$$

The following is a definition of the credible neural network's difference degree:

$$A^T \int \mathrm{dxp}(x)\left(V(x) - \overline{V}(X)\right)^2. \tag{11}$$

Each network's weighted average generalisation error is expressed as follows:

$$\overline{E} = \sum_T k_T E^T. \tag{12}$$

The following are definitions for different levels of credible neural network integration:

$$\overline{A} = \sum_T k_T A^T. \tag{13}$$

The credible neural network integration generalisation error is as follows:

$$E = \overline{E} - \overline{A}. \tag{14}$$

4. Result Analysis and Discussion

Coordination refers to the mutual relationship between two or more systems or system elements that are coordinated, harmonious, consistent, and virtuous. Coordination is the guarantee for the positive development of multiple systems or elements. Development is an evolutionary process within a system, while coordination is a good cycle between systems or systems, and coordinated development is the intersection of the development and change of the two. In the process of coordinated development, development is the ultimate goal of the system movement, while coordination is the internal and external constraints on the development behavior. Coordinated development requires all elements of the system to achieve from single to complex and from disorder to order on the basis of coordination, harmony, and good circulation. The process of this coordinated development is bound to have diversified development, which is regulated and constrained by various activities, and finally promotes the realization of goals through mutual coordination.

Environmental monitoring data come from different data sources, so it is necessary to integrate data from different sources. In a database with differences, the redundancy and inconsistency of data will be affected by some attribute identification problems, and some attribute problems will be affected by the export of other attributes. Therefore, in the process of data analysis, we must solve the problem of data integration redundancy. In order to solve the problem of data redundancy, data analysis is required. In the face of two given attributes, we can judge the degree of correlation between the two attributes and whether one attribute can contain another attribute by applying analysis methods. In the face of nominal data, the chi square test can be applied to verify whether the two attributes are related.

The average minimum error of the integrated system learning training 5000 is 0.00641 and the prediction error is 0.00712. The fitting curve is shown in Figure 3.

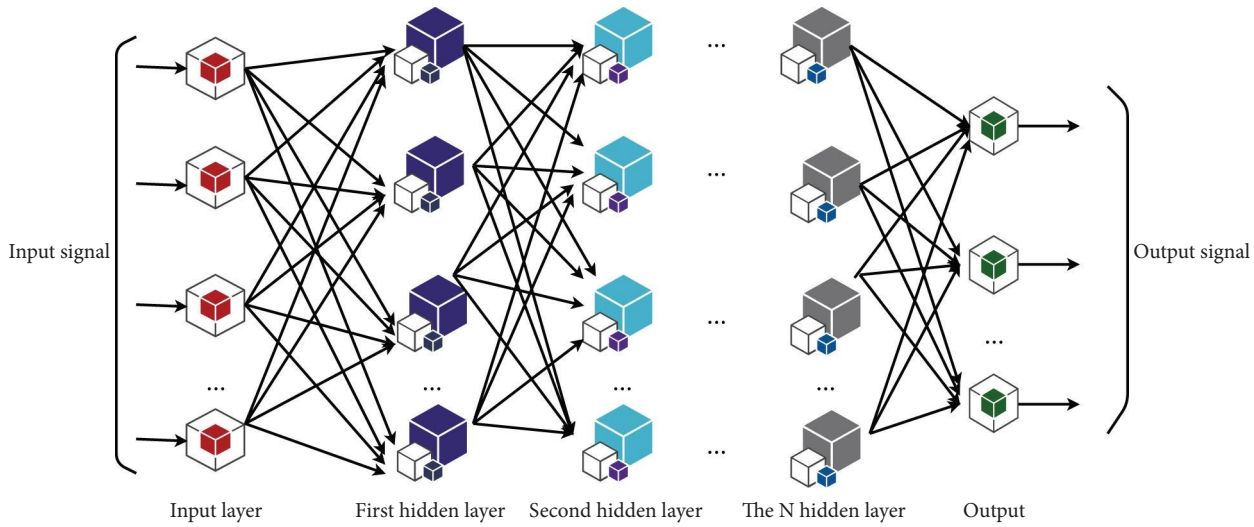

Figure 2: Structure of BPNN.

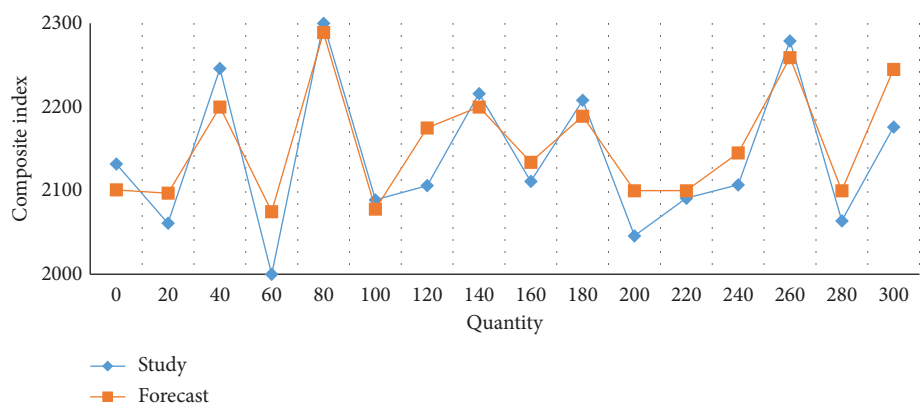

Figure 3: Fitting curve of integrated system.

The generalisation ability of the integrated system is higher than that of a single independent model. The integration of these models makes the new integrated system for environmental and economic coordination prediction contain more extensive input information, including basic data information, technical index information, and more economic information. This will certainly make the model more robust and more valuable. At the same time, the artificial neural network model breaks through the limitation of the target time point and provides a new way for the actual economic modeling.

When the standard BPNN performs function fitting, the training error decreases slowly until the maximum number of training steps is reached, and the network error still does not reach the target error. The comparison between the original function curve and the fitting function curve is shown in Figure 4. It can be seen that there is a certain gap between the fitting curve and the real function. Therefore, it can be inferred that the performance of the standard BPNN is poor, the network has a large error, and it is not easy to converge.

The problems of BPNN are as follows. (1) Low learning efficiency and slow convergence speed: the convergence speed is an important standard to evaluate the performance of the network. Due to its own limitations, the learning speed

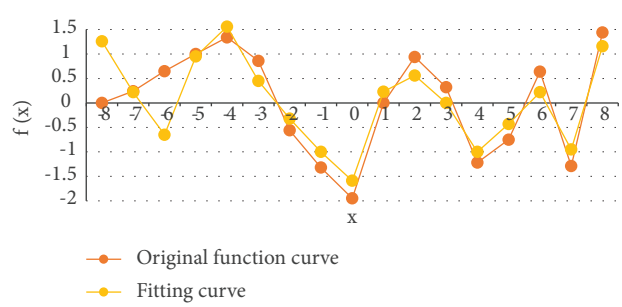

Figure 4: Fitting curve of standard BP network function.

of BP arithmetic is set too small to ensure that the neural network can converge. Even if it deals with simple problems, it needs thousands or even tens of thousands of times of training to meet the expected requirements. (2) It is easy to fall into local minima and miss the optimal solution. BPNN is a nonlinear optimization model. It takes gradient descent method as the learning rule and trains along the direction of continuous decline of the error function. The trajectory formed by the value of the error function is a very tortuous curved surface structure, and usually there are many

minima. (3) There are many network parameters and it is difficult to determine. The theory is not mature and can only be determined by experience. (4) It is highly dependent on samples and network structure. The convergence characteristics and approximation ability of BPNN are closely related to the selected training samples. Improper use of sample data directly reduces the effect of BPNN.

Because of its robust nonlinear approximation capability and versatility, BPNN is frequently employed in various disciplines; however, it has certain clear issues during the training phase. The most notable one is the possibility of numerous minimum points and error flat zones on the error surface. When the former occurs, the training may enter a local minimum and the network cannot converge; when the latter occurs, the weight adjustment span will get smaller, the error will decrease gradually, and the convergence speed will be too sluggish. The arithmetic structure is typically altered to optimise the network in order to apply to increasingly complicated practical issues. Among the many optimization techniques, the LM arithmetic used in this study optimises the BP network to provide it a faster convergence speed and good local convergence features, which significantly raises prediction accuracy and efficiency.

In order to verify the good performance of the improved neural network, the improved neural network is applied to the same function $f(x)$ model and the same function fitting is carried out. The network error training curve obtained through training is shown in Figure 5. It can be clearly seen that the training error decreases rapidly and reaches the target error value in Step 10. It can also be clearly seen from its function fitting (Figure 6) that the fitting function almost completely approximates the original function. It is sufficient to prove the superiority of LM-BP improved neural network, which can effectively reduce the error, improve the training speed, and improve the overall network performance.

In order to more clearly reflect the good effect of the arithmetic prediction in this paper, the BPNN prediction method, LM-BPNN prediction method, and the improved prediction method in this paper are compared and analyzed. The relative error comparison curve is shown in Figure 7.

It is easy to find that compared with the BPNN prediction method, the prediction error of the improved prediction method is greatly reduced, and the prediction error curve fluctuates around 1%, the prediction model is more stable, and the prediction accuracy is significantly higher than that of the other prediction method, which fully proves the superiority of the method. Comparing and analyzing the above two short-term load forecasting methods from different angles through numerical analysis can more comprehensively and scientifically verify the advantages and disadvantages of the methods. The comparison of the performance parameters of the two forecasting methods is shown in Table 1.

From the numerical relationship in the table, the convergence performance of the improved prediction method of LM-BPNN is significantly higher than that of the traditional

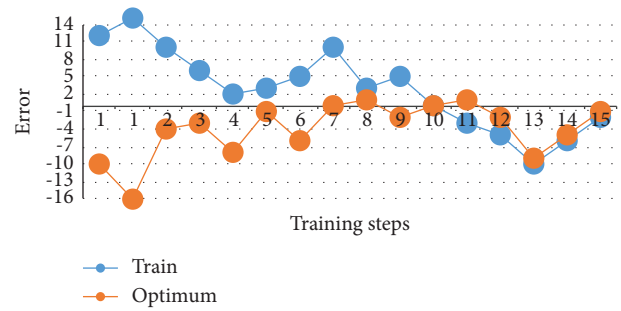

Figure 5: LM-BPNN training error curve.

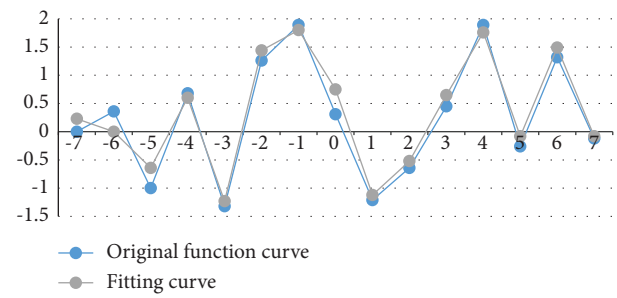

Figure 6: LM-BPNN fitting function curve.

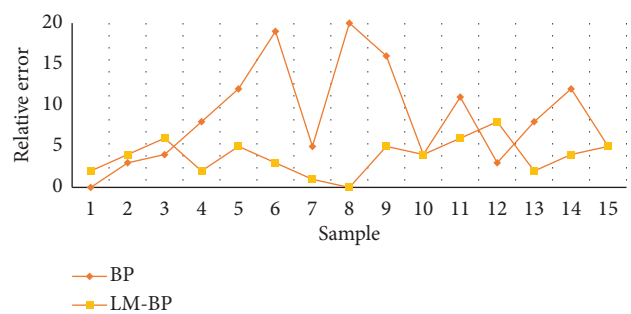

Figure 7: Comparison of error curves of two prediction methods.

BP network, and the prediction result is more stable and accurate. It shows that LM arithmetic successfully realizes the optimization of the defects of BPNN, effectively improves the prediction effect, and improves the prediction accuracy and prediction efficiency.

Aiming at the characteristics of data correlation and information embedding of multiparameter new environmental and economic factors, this chapter adopts the big data analysis method to preprocess the data of multiparameter new environmental and economic factors, simplify the data structure, realize the transformation from high dimension to low dimension, and eliminate the correlation between parameters. The application of the prediction model to predict the new environmental-economic data and the error analysis of the prediction results fully proves the practicability of the improved prediction arithmetic in this paper, which can effectively improve the prediction effect and improve the prediction accuracy.

Table 1: Comparison of performance parameters of two prediction methods.

Error index	Traditional BP prediction method	LM-BP improved prediction method
Training steps	10000	10
Mean absolute error	245.36	182.31
Mean absolute error	431.26	211.64
Average relative error	2.94	2.12
Proportion of relative error ≤1%	33.12	33.12
Proportion of relative error ≤3%	70	64.29
Proportion of relative error ≤5%	82.12	100

5. Conclusion

This study offers a big data analysis and neural network integration optimization design strategy for a new kind of environmental and economic coordination prediction model. The data of the new type of environmental and economic impact with numerous parameters are preprocessed using big data analysis and principal component analysis. A neural network integration system is used to create the prediction model, and prediction research and error analysis are conducted to enhance the new kind of environmental and economic model. The simulation test analysis is completed lastly. According to the simulation findings, the proposed arithmetic has an accuracy that is 8.56% higher than that of the conventional arithmetic. This result clearly demonstrates that the short-term load forecasting model based on LM-BP enhanced neural network is suggested to fully use BP network benefits in model forecasting research. In addition, LM arithmetic is used to mitigate its drawbacks, accelerate learning, and successfully avoid tumbling into local minima. The experiment shows that using this forecasting strategy can significantly increase predicting accuracy and performance. According to the notion of coordinated development of the environment and economy, consideration must be given to the environment's carrying capacity when developing the economy. Along with maintaining a suitable growth rate, development should pay attention to the effectiveness and quality of economic growth. High growth cannot be pursued unilaterally at the expense of resource depletion and environmental degradation. The two ought to get along well with one another. There are still many shortcomings in this paper. It is necessary to continuously study and improve the indicator system and evaluation method model and the application of the indicator system in other regions and evaluate, analyze, and compare the environmental-economic relations in other regions.

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 there are no conflicts of interest regarding the publication of this paper.

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Research Article

Teaching Reform of Ancient Literature Based on Credible BP Neural Network Technology in New Media Environment

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Recent years have seen a progressive integration of the new media environment into people's lives, studies, and employment, which has had a profound impact on China's social economy. It is unavoidable to conduct the educational reform of classical literature in the age of new media. Data mining (DM) is a method for analysing and learning from data in databases and data warehouses using artificial intelligence. They work better together to create a solid foundation for decision-making analysis of businesses or pertinent departments in many fields. The BP algorithm can cause the weight to converge to a specific number, but it cannot ensure that that value is the error plane's overall minimum. In order to correct the flaw that the BP neural network is prone to falling into local minima, the improved credible BP neural network used in this paper adopts the momentum factor. The findings demonstrate that there is little variation between the predicted value and the actual value achieved by applying the BP algorithm in the experimental group with order of magnitude standardised operation, and that this algorithm's error has been decreased by 7.38%. It demonstrates that by examining students' test scores in a data warehouse with a neural network algorithm in DM, we may discover potential patterns among the data.

1. Introduction

In Chinese universities, the main course for Chinese language and literature majors is ancient literature, which is crucial to the humanities. In order to meet the new requirements of the state and society for higher education personnel training, many universities across the nation are implementing teaching reform and attempting to make use of the convenience brought by information technology to improve the teaching quality and students' quality. With its deep ideas and beautiful works, Chinese ancient literature is a typical course for Chinese majors that draws in a lot of students. Chinese students who were interested in continuing their education in the 1980s and 1990s tended to choose Chinese literature as their major. In recent years, new media has steadily reached every nook and cranny of society and has become an integral part of how people learn, live, and work. Reforming the way that ancient literature is taught has become a must-do trend in the age of new media [1–3].

The development of students' aesthetic ability and the passing down of traditional culture are given top priority in the ancient literature curriculum, according to the needs of the curriculum standards for pupils. The college Chinese curriculum standard also defines the purpose of learning ancient excellent works, which is not only to understand the spiritual connotation of Chinese traditional culture, but also to experience the positive significance brought by ancient works with modern unique personal experience. Ancient literature can also exercise thinking, screen out effective information in the process of reading, and form its own thoughts and opinions. For a long time, the problems in the teaching of ancient literature in China, such as time-consuming, little effect, students' lack of innovative spirit, poor practical ability, passive learning style, and negative emotional experience, have become increasingly out of harmony with the development of the times. Therefore, learning classical Chinese is not only to know some knowledge of ancient Chinese and ancient culture, but also to inherit traditional culture. It can help students build national self-

esteem, cultivate their national cultural awareness, and enhance their national cultural heritage. In the teaching of ancient literature in universities, ancient literature works are often ignored by teachers, or inappropriate methods are adopted for teaching. Therefore, it is imperative to study the teaching of ancient literature works.

The traditional teaching approach frequently places a strong emphasis on instructional materials, which somewhat restricts the course's coverage of ancient literature. The educational material, however, can be increased in a variety of ways with the advent of the new media period. Giving students' subjective initiative wide reign, letting them work through issues on their own, and deepening their comprehension and memory are all benefits of this teaching approach. Additionally, it is crucial for teachers and students to communicate when studying ancient literature. The contact between professors and students, however, cannot be sufficient due to the time constraints of the classroom. The performance of students in the study of classical literature will undoubtedly deteriorate over time. Despite the fact that some teachers are concerned with humanism, it is simple to teach Chinese as a political and ideological lesson, so they do not focus on how the article should be interpreted as having felt. Second, the teaching approach is ineffective and the learning outcomes are unsatisfactory since it cannot teach pupils in accordance with their potential. The author, therefore, explores the reform of teaching ancient literature and offers matching alternatives based on DM (data mining) technology.

1.1. Research Innovation

(1) Inquiry learning focuses on cultivating students' ability of independent thinking and autonomous learning, which can make the course more flexible. This paper illustrates the characteristics of inquiry learning in ancient literature teaching: first, the openness and pertinence of topic selection; second, the autonomy and cooperation of inquiry process; third, the exploration and diversity of inquiry methods; and fourth, the comprehensiveness and innovation of ability cultivation.

(2) One of the most active areas of database research, development, and application is data warehouse and data mining (DM), which are also crucial components of decision support systems. This work proposes the use of data warehouse theory and DM technology to teaching quality evaluation and examination analysis based on research into these concepts as well as the peculiarities of examination analysis systems.

2. Related Work

2.1. Present Situation of Ancient Literature Teaching. Liu et al. pointed out that although ancient literature is different from novels, essays, and other literary genres, it can also improve students' listening, speaking, reading, and writing abilities [4]. Maharsi et al. put forward the following: strengthening the teaching of ancient literature and imparting knowledge of ancient literature writing to help students understand the society and broaden their horizons [5]. Rahman and Pandian mentioned that many teachers used the fixed structure mode of ancient literature to change the reading teaching of ancient literature communication texts into fast reading material training, which was a wrong way to obliterate the characteristics of texts [6]. Secondly, researchers generally believe that there are problems in the existing teaching materials. Syrbe and others pointed out that when designing teaching objectives, we should start from the differences between ancient literary styles and other styles. In the process of sorting out, it can be found that frontline teachers mostly sum up their experience and reflect on actual teaching, while researchers put forward ideas based on the actual situation and supported by theories [7].

Walker et al. analyzed students' psychological barriers in reading tragic works through the reading survey of students and then put forward the methods of psychological cultivation [8]. Proietti Ergün and Dewaele classified tragic works from different angles and discussed the significance of tragic works to students' life education [9]. Mierzwa focused on analysing students' feelings about tragic works from the perspective of characters and teachers' teaching methods [10]. In fact, there are great differences between Chinese and Western tragic consciousness and expression forms, so we should have such understanding and different teaching strategies in the teaching process. Therefore, this paper chooses the tragedy of ancient literary works to study.

2.2. DM Technology. In general, DM describes the process of removing secret knowledge and information from a massive volume of loud, hazy, unfinished, and random practical application data. Discovery knowledge is relative, subject to certain assumptions, limitations, and disciplines; it is not universally true or applicable everywhere.

Up to now, research on DM and knowledge discovery of relational databases and transactional databases has made some progress, and Karimi et al. have carried out optimization and transformation of association rule mining algorithm [11]. He and Yin used the association rule discovery technology to mine the university personnel information database, trying to find out the factors that affect the development of various disciplines and the relationship between them [12]. Hodge et al. use regression linear analysis and association rules to determine what kind of methods are suitable for what kind of students. DM is mainly used in individualized teaching and curriculum arrangement of students in universities [13]. Kazancoglu and Ozkan-Ozen built on a comprehensive and perfect information application to support high-level decision analysis, while the transaction processing database undertakes the daily operational task in the enterprise information environment [14].

Hossain et al. made use of DM technology, and they tried to find out the interrelation of various factors from the data and found some new laws that were produced with the dynamic changes of various factors to guide the school sports research and teaching training and then found sports

talents [15]. Li et al. also discussed and studied the knowledge discovery of Web DM and unstructured data [16]. Ahmad and Khan put forward an improved method for K-means algorithm in clustering analysis algorithm. This is a method that combines clustering algorithm with methods in other fields. Experimental results show that this kind of method can improve some defects of clustering algorithm and improve the performance of clustering algorithm to a certain extent [17]. Gong et al. put forward a new idea; that is, the whole data space is divided into several subspaces by data parallelism method, and then each subspace is clustered in parallel, and then the clustering results are output [18].

3. Methodology

3.1. Establishment of DM Model. Under the new media environment, the teaching form of ancient literature is affected. With the change of traditional and single teaching form, the teaching form of ancient literature in universities has undergone essential changes. In addition, the teaching mode of ancient literature in the new media environment has broken the limitation of time and space, and the communication of literature knowledge between teachers and students is no longer confined to the classroom. Instead, we should make use of network resources and media resources to improve students' appreciation of literary works and enhance their literary literacy so that students can fully grasp the basic situation of literary works and improve their own understanding of literary works, their grasp of the author's thoughts and feelings, and their understanding of the current social situation. For example, the appearance of all kinds of false information will affect the teaching reform of ancient literature to some extent.

The course of ancient Chinese literature should adopt the mode of combining students' lectures with teachers' supplementary lectures; that is, teachers select certain chapters as tasks and distribute them to students. Students prepare them in advance and give lectures in class, while teachers play a supplementary role in commenting, while some difficult chapters are given lectures by teachers. Pass the syllabus, assessment methods, task assignment, and other learning materials to the group. The syllabus is the overall design of the course, and the assessment scheme can make students clearer about their tasks. For example, exploring the interactive relationship between literature and the society at that time requires profound historical accumulation, which cannot be accomplished independently by students who have just come into contact with ancient literature, and teachers need to analyze, demonstrate, and guide them in class.

If the ancient literature teaching mode wants to fully adapt to the new media environment, the university must create a brand-new teaching idea, improve the traditional teaching mode in essence, make the ancient literature teaching activities break away from the traditional teaching mode, and make full use of the computer technology and network resources in the new media environment in the ancient literature classroom. Teachers should be deeply aware of their important responsibilities as classroom leaders. Besides designing learning plans and imparting knowledge, they should also focus on guiding students. In the classroom, teachers can effectively enhance students' understanding of ancient literary works and deepen students' impression of the works by playing multimedia audio and video.

In DM, there are many different methods for mining and analysing data sets [19, 20] in order to find patterns and apply them. Classification is one of these approaches, and people are familiar with its techniques. The correct classification of data will have a direct impact on the reliability of mining results and the effectiveness of mining patterns. Every object has been connected to a recognised class label. The classification algorithm creates a model after learning from the training set then utilises this model to categorise fresh items. The classification stage predicts the prediction data using the classifier that was created during the learning step.

The entropy calculation formula of the set D is as follows:

$$\text{Info}(D) = -\sum_{i=1}^{m} p_i \log(p_i). \tag{1}$$

Clustering is a challenging frontier research hotspot in DM. In some applications, clustering is also called data segmentation, which aims to cluster data sets into data groups according to the similarity characteristics of data. Internal metrics are usually used when the structure of the processed data set is unknown. It evaluates the performance of clustering algorithm according to the inherent characteristics of computing data objects.

A simple internal measurement method is that compactness is calculated by some distance function, such as calculating the sum of squares of distances between each object in a cluster and the cluster center:

$$t(C) = \sum_{i=1}^{k} \sum_{x \in C_i} d(x, \overline{x}_i)^2. \tag{2}$$

The degree of separation between different clusters can be defined by the distance between cluster centers:

$$s(C) = \sum_{1 \le j < i < k} d(x, \overline{x}_i). \tag{3}$$

The overall efficiency of the final clustering algorithm can be defined as using $t(C)/s(C)$ to calculate. $t(C)$ requires o operations, while $s(C)$ requires $O(n)$ operations.

The design of data warehouse in the teaching quality monitoring and evaluation system is a complete and encapsulated technical architecture, which adopts the top-down structure. This system divides it into six parts: basic system network, data collection and integration, data warehouse, data mart, multidimensional database, and data analysis and display. The functional hierarchy diagram is shown in Figure 1.

Data Extraction Module and Data Source Monitoring Module. Data sources are distributed, heterogeneous, and autonomous, which can provide the data warehouse with

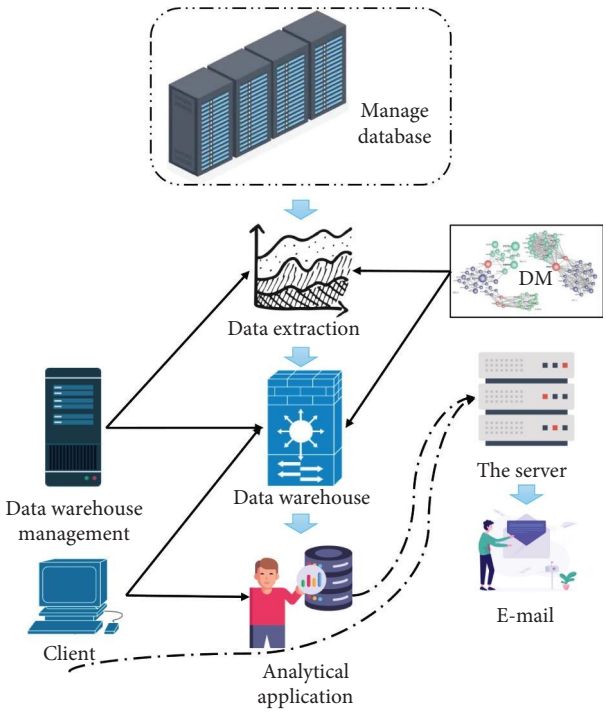

Figure 1: Functional hierarchy diagram.

basic information of teachers, basic classroom information, teachers' further education, and relevant government regulations. In the data conversion area, check the data quality of the source system, form an inspection report, and deal with the corresponding errors. For serious errors, the system maintenance personnel need to deal with them on-site. Data loading loads the data of data conversion into the data warehouse and forms a report of data loading.

At first, the dynamic itemset counting technology also adopts the idea of partition, but it divides the database into a number of blocks marked with starting points, and it can add new candidate itemsets when searching any block marked with starting points.

Usually, n-dimensional values are used to describe the attributes of the training set of samples. Each sample represents a point in the n-dimensional space; that is, all the training tuples in the training set are represented in the n-dimensional space. Euclid's definition of distance is used to describe the problem of distance. Suppose two points in the n-dimensional plane; the distance between two points is

$$d(x_1, x_2) = \sqrt{\sum_{i=1}^{n} (x_i - y_i)^2}. \tag{4}$$

The improved K-means selects the initial clustering center by combining the improved longest distance method with the mixed clustering method. After improvement, the parameter α is added based on the Euclidean distance between samples:

$$d_F(x_i, x_j) = \alpha \left(\sum_{k=1}^{p} \left| x_{ik} - x_{jk} \right|^2 \right)^{1/2}. \tag{5}$$

Choose the class with the largest number of k-nearest neighbors, which is the class of the given unknown sample.

3.2. Teaching Evaluation of Ancient Literature Based on DM Technology. As a teacher of the course of ancient literature, he should have a sacred responsibility, know his historical mission, and be positioned as a disseminator and researcher of national culture and traditional literature, rather than a single teacher. Ancient literary works contain Chinese traditional philosophical thoughts, values, and aesthetic ideals. They are rich in forms and styles, both theoretical and practical, and are most suitable for students to accept. The interpretation of ancient literature can make students have certain rational thinking and avoid students' lack of logical thinking ability. This is not a denial of literature, but a respect for Chinese traditional literature. This kind of simple content makes students' understanding of ancient literature deviate, and it also leads students to study only for exams, which cannot reach the ultimate goal of ancient literature curriculum.

Teachers use a life story to develop learning situations and bring psychological impact to students. In relevant discussions, students have a more intuitive understanding of life. Students have intuitive perception of life, and life phenomena, life events, life stories, life feelings, and so on can all form new training contents. Teachers should closely combine the contents of teaching materials and assign more life-oriented training tasks to students. Teachers should have the awareness of connecting with each other, think about the content of teaching materials and the cognitive basis of students' life, and use various teaching aids to carry out specific operations so that life-like situations can play a greater role in helping students, and students can smoothly enter the learning process.

We must actively develop the teaching concept, enhance the delivery method, and free the teaching activities from the confines of the conventional delivery method if we are to adapt the teaching of ancient literature to the new media environment. Boost student learning passion while also improving the teaching environment and form. In order to improve students' comprehension and perception of ancient literature, teachers and students should also make full use of new media products, such as well-liked communication software, to improve communication among them, break down the physical and temporal barriers of the classroom, and strengthen the communication of literature knowledge outside of the classroom.

The evaluation of university teaching quality refers to the process of assessing the teaching effect and the degree of goal realisation and making corresponding value judgments and improvements through systematic detection and

examination of the school's teaching environment in accordance with specific teaching goals and teaching norms. Theoretically, it is rather simple to create a decent teaching quality evaluation system, but the most important and challenging aspect is making it function in actual classroom situations. It can only be kept up for a long period with great operability. In order to lighten the workload, most institutions now use the student sampling assessment approach, which involves asking a lot of work-study students to help count and input the evaluation forms before using spreadsheets or standalone database application systems to calculate the results.

A crucial element in the DM process is data preparation. The adage "Useless input usually results in useless output" [16] is particularly relevant to DM applications. The data of some transactions may be inconsistent. Some of the inaccurate data can be manually updated using outside sources. In accordance with the properties of the processed data, the LMS (Least Mean Square) algorithm automatically alters the processing strategy, processing flow, processing parameters, boundary conditions, or constraint requirements. The optimal processing outcome is achieved because it may then be adjusted to the statistical distribution features and structural characteristics of the processed data.

The LMS algorithm is modified frequently. The weight vector w in the network needs to be modified each time the data from the training set is trained. u can be represented as a matrix:

$$u = w^T x. \tag{6}$$

The output of the neuron is obtained once u is introduced into the activation function:

$$\begin{aligned} o &= f(u) \\ &= f\left(w^T x\right). \end{aligned} \tag{7}$$

Information gain theory originated from information theory and is widely used in many fields. DT classification algorithm ID3 uses information gain as an attribute measure selection. Attribute measure can be regarded as a criterion of selective splitting, which always heuristically divides the data of training tuples with given classification marks into individual classes.

Assuming that there are N attributes in the data set, after calculating the information gain value of each attribute, the calculation definition of weight ω_A for each attribute A in this paper is shown in the following formula:

$$\omega_A = \frac{\text{Gain}(S, A)}{\sum_{i=1}^{N} \text{Gain}(S, i)}, \tag{8}$$

where $\sum_{i=1}^{N} \text{Gain}(S, i)$ is the sum of the information gain values of each attribute.

An extra momentum strategy can be employed to fix this issue. To correct the flaw that the BP network is prone to falling into local minima, the enhanced BP network adopted the momentum factor. This method, which is based on the back propagation method, generates a new weight change by using the back propagation method and adding a value proportional to the previous weight change to each weight change. The following is the weight adjustment formula for added momentum:

$$\begin{aligned} \Delta w_{ij}(k+1) &= (1 - mc)\eta\delta_i x_j + mc\Delta w_{ij}(k), \\ \Delta b_i(k+1) &= (1 - mc)\eta\delta_i + mc\Delta b_j(k). \end{aligned} \tag{9}$$

Among them, i is the number of hidden layers, j is the number of hidden layer nodes, k is the number of training times, Δw is the increment of weight, η is the learning rate, δ is the network learning error, x is the network input, and mc is the momentum factor.

The number of layers and units in the network's hidden layer is often chosen based on experience or through numerous tests, and there is no theoretical guideline for doing so. As a result, the network frequently has high redundancy, which also somewhat raises the difficulty of online learning. Figure 2 depicts the system's neural network model for this project.

In most cases, BP algorithm can converge to the optimal solution faster than genetic algorithm, but it is also easy to fall into local optimum. The advantages of BP algorithm lie in its simple concept, easy realization, fast convergence speed, and few parameters to be adjusted. Particle swarm is not a single particle, but a set of multiple particles, so particle swarm represents a set of solutions to a problem. The flight process of particle swarm is the search process of constantly optimizing the solution set of the problem. We will cluster enormous amounts of data right now. According to theory, there will be lots of issues if the starting population is large. We still need to set the population as large as feasible within the circumstances of varied facilities, though, in order to diversify the data elements. Given that in the initial stages of evolution, the population will consist largely of the progeny of exceptional individuals, the fitness values will be near in the later stages. Currently, selection activities practically bring the evolution of the entire population to a complete halt since the benefits of the progeny of exceptional individuals are not highlighted.

4. Experiment and Results

After finishing the preprocessing operation of the student information database, we finally determined eight attribute information to be clustered. However, since the number of student records accumulated over the years is a huge number, this paper decided to select student information and randomly selected 8 students to do 8 experiments with this algorithm and K-means algorithm, respectively, and randomly selected 100 student records in each group.

The number of final clusters, the number of ants moving during the iterative process of the algorithm, the running time of the algorithm, and F-measure were used to compare the clustering effects of the two methods after experiments were conducted on the comprehensive information data of eight groups of students using the distribution of the algorithm in this paper and the conventional K-means algorithm. The algorithm could run up to 2000 times, and the number of ants was limited to 70. The results are shown in Tables 1 and 2.

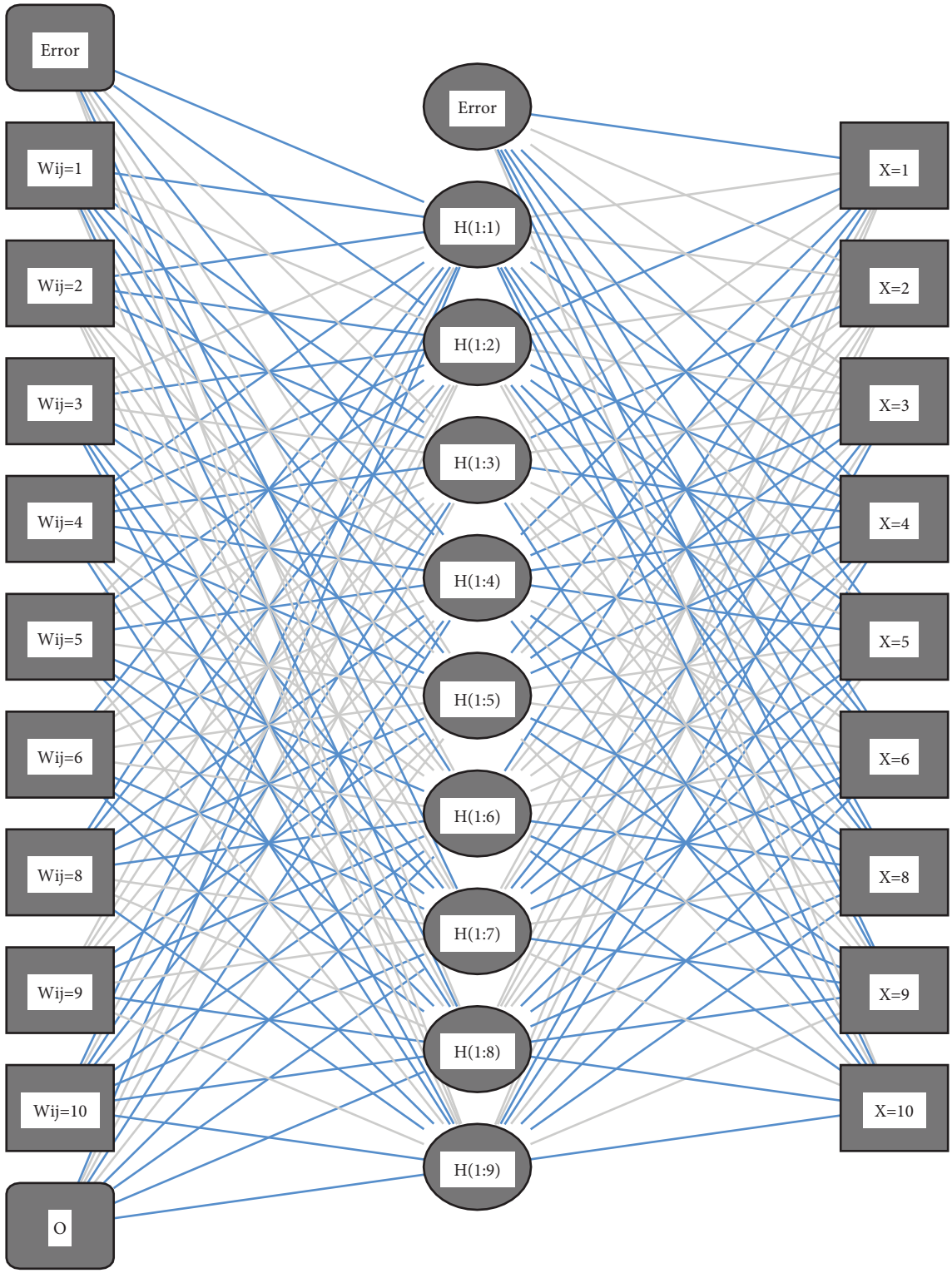

Figure 2: BP network model design.

Table 2 above shows that this algorithm performs clustering better than the conventional K-means algorithm in terms of the crucial F-measure value and processing speed. The clustering procedure has fewer moving ants than the K-means algorithm does at the same time. One significant factor is the algorithm's use of the adaptive termination condition, which enables automatic algorithm termination before the clustering aim is achieved. Students' data is trained using the BP algorithm to forecast the firing effect of ore composition. For comparative training, there are two strategies employed. Without order of magnitude normalisation, the initial data from a collection of experiments are

Table 1: Clustering results of this algorithm.

Group	Cluster number	Number of moves	Running time (s)	F-measure
1	12	1851	6.165	82.512
2	11	1883	6.376	87.275
3	6	1558	5.866	84.765
4	10	2034	5.593	84.528
5	13	1440	5.873	84.55
6	13	1751	5.473	87.16
7	7	1570	5.566	85.012
8	5	1540	6.152	83.638

Table 2: Clustering results of K-means algorithm.

Group	Cluster number	Number of moves	Running time (s)	F-measure
1	6	2075	7.032	77.617
2	7	2330	7.4	80.551
3	9	2426	6.371	79.999
4	8	1592	8.484	79.917
5	10	2338	7.409	81.908
6	7	1969	8.416	78.882
7	8	1910	8.311	78.462
8	7	2235	8.59	79.104

directly preprocessed by normalisation. Eight input nodes, four hidden nodes, five output nodes, and a total of twenty samples make up the neural network. Figure 3 displays the discrepancy between the actual value and the expected outcome.

The findings of the experiment demonstrate that there is a significant difference between the anticipated value and the actual value that was achieved by applying the BP algorithm to the experimental group that did not use the order-of-magnitude standardised procedure. The error between the predicted value and the true value produced by learning it with the BP algorithm; however, it is minimal in the experimental group utilising the order of magnitude standardisation operation, and the error of this algorithm is decreased by 7.38%. As can be seen, the order-of-magnitude normalisation procedure improves the accuracy and learning performance of DM outcomes. The main responsibilities of DM module of teaching quality evaluation system are cleaning student data and evaluating DM objects, extracting and cleaning student evaluation database from teachers' files, and coding transaction database into DM objects and generating frequent itemsets in transaction database. Figure 4 is a pedigree diagram of the relationship between subject average score and teacher evaluation results, and Figure 5 is a vertical icicle diagram of subject average score and teacher evaluation results.

The relationship between average student scores and teacher evaluation information, data output, and graphical interface display are the above correlation summary models, and the resulting relationship information is obtained. From the relationship information in the chart, it can be roughly seen that, relatively speaking, the higher the average score of the students who substitute teachers, the higher the average evaluation score of substitute teachers. It can be concluded

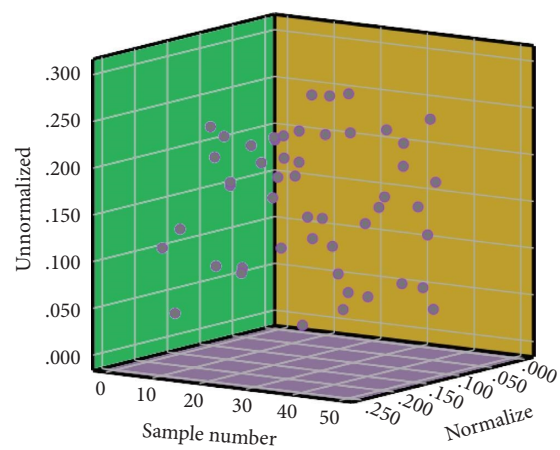

Figure 3: The error between the predicted result and the real value.

that students' scores are higher, which generally means that teachers teach knowledge in class and students accept it better. Then, through the evaluation results, the depth of mining the association rules of students and teachers, the acquisition of teaching evaluation results, and the classroom factors and student factors of teaching, it provides decision-making basis for future teaching.

According to the previous neural network model design and the functions provided by the neural network toolbox, we use MATLAB to compile programs and apply the programs to the training of students' performance prediction and calculation network models. After the training, test on the test set. Figure 6 shows the comparison between the actual value predicted by the model and the output value, and it is not difficult to see from Figure 6 that the predicted results of the network trained by this model are basically consistent with the test samples.

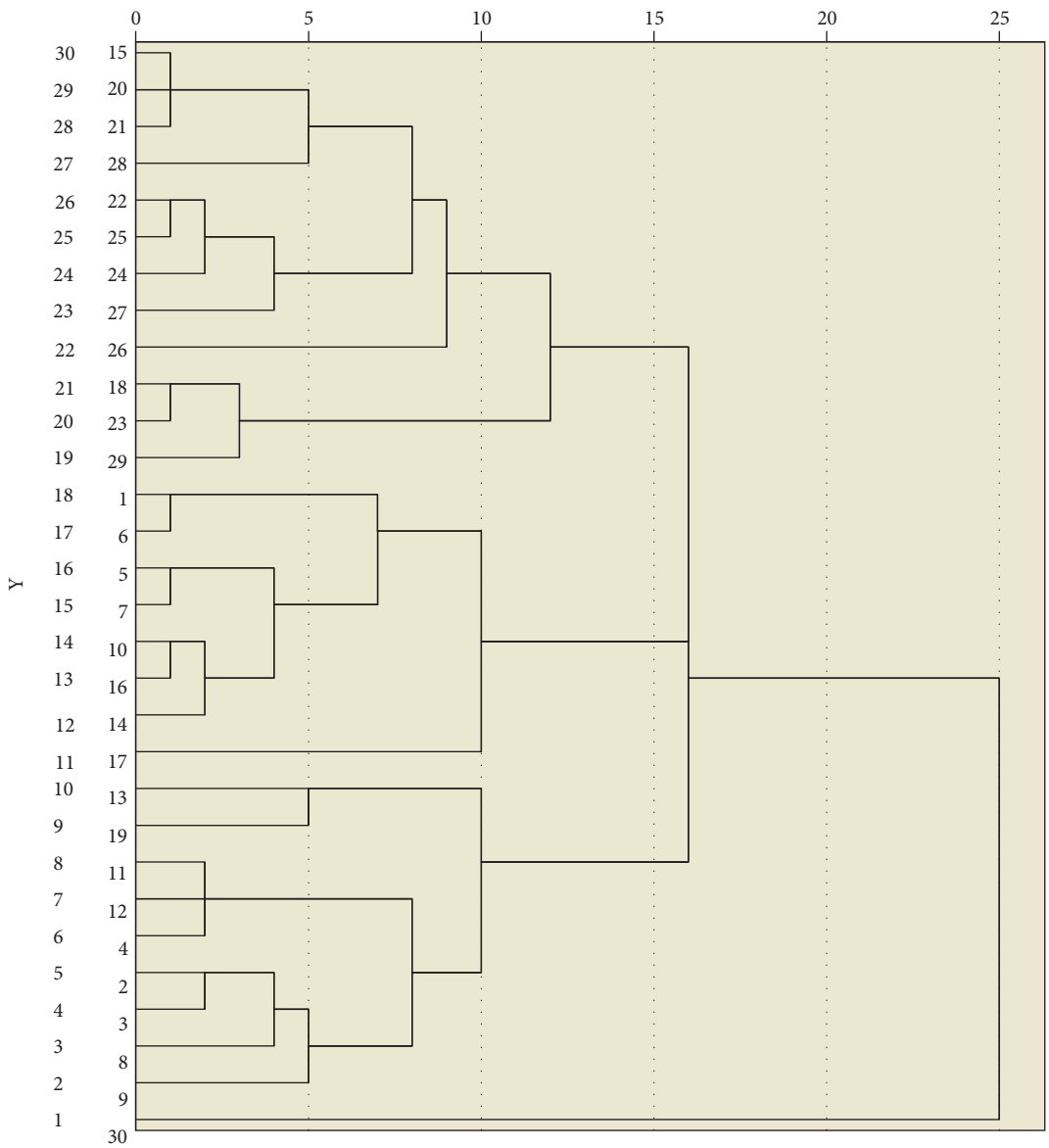

Figure 4: Pedigree diagram of the classification of the relationship between subject average score and teacher evaluation results.

Next, the data of 100 students are used for prediction. The comparison between the predicted curve and the real curve is shown in Figure 7.

By comparing the predicted curve with the actual curve, it can be seen that the general trend of students' academic performance curve is consistent, so it can be considered that the teaching situation of this course is normal and students' learning situation is normal.

Introducing inquiry learning into the teaching of ancient literature requires higher quality of teachers themselves. Because in the process of inquiry learning, students are different, and the inquiry topics put forward by students

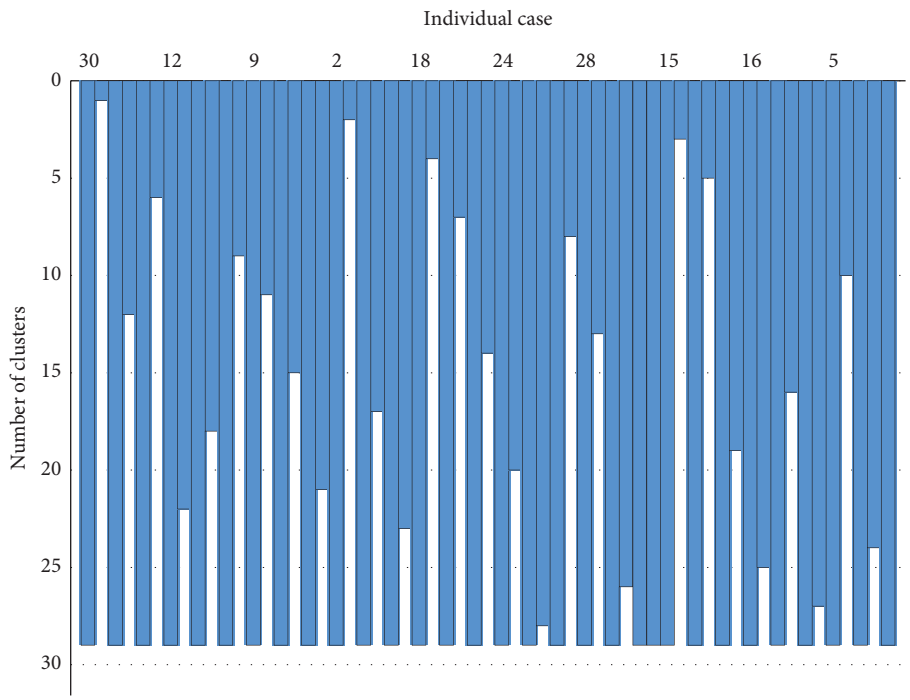

Figure 5: The vertical icicle chart of the average score of the subject and the teacher's evaluation results.

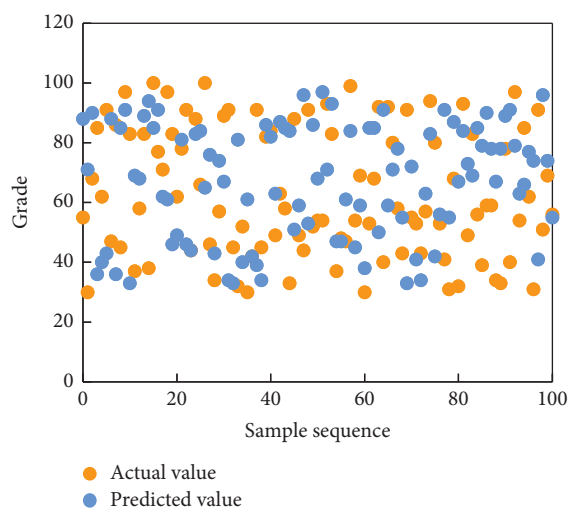

Figure 6: Students' achievement prediction.

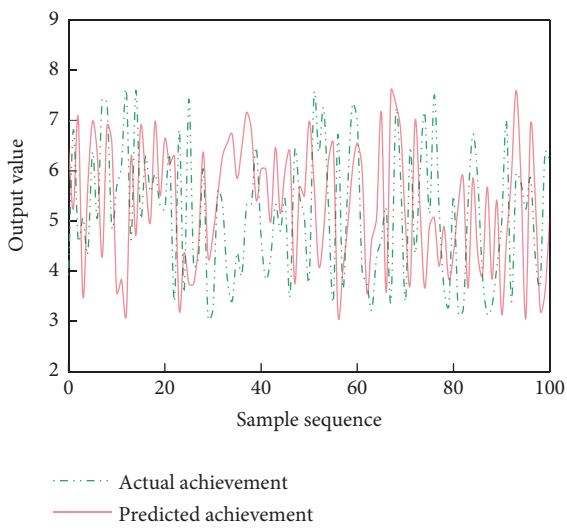

Figure 7: Students' achievement situation map.

are also different, teachers need to be knowledgeable and fully prepare lessons, not only for texts, but also for students.

At the same time, through a large number of literature reading, it also provides a solid theoretical foundation for the improvement of experimental content and form design and implementation skills. In the process of exploring topics with students, some tips are also learned for finding information from students. These are all valuable experiences in one's life.

5. Conclusion

Various network resources and media products lack market oversight and management in the new media ecosystem, which causes a plethora of unreliable material to infiltrate academic instruction. In DM, there are many different methods for mining and analysing data sets in order to find patterns and apply them. Classification is one of these approaches, and people are familiar with its techniques. The teaching quality monitoring and assessment system's data warehouse is designed with a comprehensive and integrated technical architecture. Data conversion output is loaded into the data warehouse during data loading, which also creates a data loading report. To correct the flaw that the BP network is prone to falling into local minima, the enhanced BP network adopted the momentum factor. The order-of-magnitude standardised operation used by the experimental group, which is investigated by the BP algorithm, has a tiny error between the predicted value and the actual value, and the algorithm's error is decreased by 7.38%. Modern university professors can only improve the learning environment in the classroom, boost student's interest, expand the transmission of knowledge about ancient literature, and support the reform process of teaching ancient literature if they adapt to the development needs in the new media environment, fully understand the power of using media products, and integrate ancient literature with new media.

Data Availability

The data used to support the findings of this study can be obtained from the author upon request.

Conflicts of Interest

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

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Research Article

An Optimization Model of Applied Career Planning for Innovative and Entrepreneurial Talents Based on Credible Neural Networks

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The best career goals are determined in accordance with their own careers by thoroughly analyzing and weighing their own interests, hobbies, abilities, and characteristics in light of their own career's subjective and objective conditions, as well as by measuring, analyzing, and summarizing those conditions. To accomplish this, we follow the trend and develop sensible plans. This study investigates career planning and the development of creative and business-minded skills using well-respected neural network technology. According to the research, the neural network technique in this study has the highest accuracy of the three ways. The maximum accuracy rate can reach 78.3%, according to the trend in the figure. Data mining is next with the highest accuracy rate at 62.9%, and big data is last with the highest accuracy rate at just 46.7%. As can be seen, this approach is more suited for evaluating the correctness of theoretical knowledge. Shaanxi can optimize the benefits of higher education and improve students' understanding of career planning and social competitiveness by incorporating the concept of career management into the practice of developing applied abilities.

1. Introduction

The career planning, innovation, and entrepreneurship education of college students have an impact on not only their individual development but also the future growth of the national economy and society. To continually raise the bar of career planning instruction for college students against the backdrop of innovation and entrepreneurial education, it is necessary for the government's collaboration, support, and efforts, as well as those of institutions and graduates. During school, college students take part in social practice by participating in innovative and entrepreneurial training programs and other activities and pursue the unity of practice and cognition, helping students to plan their careers in time and accurately, improve their professional cognitive ability and self-evaluation ability, fully understand their own personality characteristics and quality advantages, realize days and nights in Wuhan's job suitability, and maximize their own potential and characteristics [1]. Therefore, from the perspective of university students, this paper studies the career planning of university students and the cultivation of innovative and entrepreneurial talents. Career planning is not simply looking for a job. Its original intention is that students can fully understand and grasp themselves and combine their own characteristics and professional expertise to achieve their own life goals through planning and design to form a complete and systematic career blueprint. Career planning is an important content of employment guidance in the institution of higher learning. It is an important tool to help students in higher vocational colleges to clarify their career development direction and scientifically plan their career development path. Higher vocational colleges and students are placing more significance on career planning as a result of the constant rise in employment pressure and the constant improvement of students' employment awareness [2]. Higher vocational colleges currently face a number of issues, including weak student foundations, teachers who lack an innovative mindset, and a lack of an innovative environment on campus. One of the key problems that all higher vocational

colleges need to address is how to create an innovative talent training system that is three-dimensional and comprehensive. To explore career planning for university students and the development of innovative and entrepreneurial talents, it is important to establish the educational concept of developing students' potential and placing a priority on their sustainable development. This is because innovation and entrepreneurship training programmes are being implemented in institutions of higher learning.

An essential supporter of the western region's economic growth is Shaanxi Province. Building new, application-focused undergraduate institutions in the area will be a crucial strategic move in the growth of the local economy. This essay investigates the development of inventive and entrepreneurial skills through career planning and the newly constructed applied technology type in Shaanxi Province. Under the guidance of the scientific outlook on development, with employment as the guide, with ability training as the core, with postneeds and professional standards as the basis, and with the objective of cultivating students' comprehensive professional ability, it solves the problems such as the disconnection between the professional curriculum system, teaching contents, and the actual needs of enterprises and employment posts. According to the curriculum development idea of combining work and learning, we build a professional curriculum system [3, 4]. Application-oriented skills training's objectives are to help students to discover a career that meets their personal development goals based on career planning, to establish the best fit between a person and a career, and to maximize the worth of each individual. The employment programmes set up by the government serve as a reliable source for the introduction of applied technical talents. Skilled skills are "revitalized" as the primary method for improving the mechanical and electrical construction ability. Engineering and education working together are adequate to address the mechanical and electrical talent gap. The reform and construction courses are viewed as the vital link in enhancing the caliber of ongoing education and teaching of mechanical and electrical talents, actively fostering the education of mechanical and electrical talents, enhancing the mechanical and electrical employment system, and enhancing the overall bearing capacity of various types of enterprises.

Career planning is an important part of university students' career development and employment guidance. It is an important tool to help university students establish their career development direction and scientifically plan their careers. Facing the increasingly severe employment form, the employment of university students is more and more concerned and valued by society, schools, and university students. To fully implement the innovation education of university students, all stakeholders must work together, from department leaders to teaching faculty and from administrative departments to student groups. This requires unifying thinking, scientifically planning the cultivation of students' innovative ability from the university's long-term development strategy, and requiring full cooperation from all parties. University students should establish their own career goals and carry out scientific career planning, which is obviously of great importance for cultivating university students' professional awareness, improving their professional ability, enhancing their professional concept, and promoting their employment [5]. Establish a leading group of innovation and creation activities composed of scientific research, educational affairs, academic management, Youth League Committee and departments, set up innovative scientific research topics for students, arrange guidance teachers, set up innovative ability training courses, hold innovation and entrepreneurship competitions, prepare for the establishment of professional innovation associations, and carry out innovative and creative community activities, so as to constantly broaden the innovative vision of students. Therefore, according to their professional interests, university students can transform their career goals into a practical action plan, which is conducive to the realization of their career goals.

By carrying out career planning education courses, higher vocational colleges are not only conducive to the personal career development of university students but also conducive to the realization of the purpose of running a school [6]. Career planning and design can be taken as the entry point of Shaanxi applied talents' training mode, and the concept of career management can be infiltrated into the practice of Shaanxi applied talents training, so as to maximize the potential of higher education and enhance students' career planning awareness and social competitiveness. The innovation of this study is as follows. (1) This study analyzes the ability of career development based on credible neural network technology. The theoretical research and practice of talent training mode first appeared in general education. Subsequently, vocational education in the form of schools adopted this traditional training model in the early stages of development. With the progress of industry and the improvement of workers in social production, vocational education urgently needs to change the traditional form of talent training. A large number of educational concepts and theories with the characteristics of vocational education have emerged, including teaching methods and training models related to social work. (2) The organizational chart for the Shaanxi applied technology innovation capability training of professional staff is built. There have been significant advancements made in the fields of professional reform, the development of talent innovation consciousness, the creation of innovative works, and the skills and awards received in innovation competitions. Unlike the university's learning planning, career planning is apart from it. While career planning is a design that goes throughout a person's life and varies as time and environment change, academic planning is exclusively for the planning and design of the academic stage.

2. Related Work

Lack of career planning awareness and lack of understanding of college career planning are a common phenomenon among university students. Economic globalization brings opportunities to China's machinery industry, but it also increases challenges. Society urgently needs high-quality innovative talents. Therefore, this study puts forward some scholars' research on related content.

2.1. Research on Career Planning and Cultivation of Innovative and Entrepreneurial Talents. Hua et al. show that institution of higher learning shoulders the responsibility of cultivating talents and implementing double-innovation education, which is an important platform and turning point to complete the reform of college career planning and innovative and entrepreneurial talent training mode and realize the personal value and all-round development of university students [7]. According to Bai et al., education in innovation and entrepreneurship is primarily a form of practical education. Many institutions of higher education merely react inertly to the career planning course, fail to recognize the importance of innovation and entrepreneurship education as a key component of the talent training mode at their institutions, and do not actually incorporate it into the talent training mode in practice [8]. Wang et al. show that, due to the limitations of knowledge and experience, university students have some misunderstandings about social and career development, lack of perfect self-concept, and do not know how to plan their careers and cultivate innovative and entrepreneurial talents, which leads to 50% students' ignorance of career planning and scientific and reasonable career planning and innovative and entrepreneurial talents cultivation [9]. Zhang and Han think that the comprehensive quality of contemporary university students is low and there is no career plan, which needs to be further improved. The objective factors include the misleading of public opinion, the inadequate guidance of government policies, the influence of traditional family education ideas, the lack of career planning, and the dislocation between higher education personnel training and social needs [10]. According to Chen et al., all professors and students, as well as college administrators, must understand and value innovation and entrepreneurship education if a successful innovation and entrepreneurship education system is to be built in a higher education institution. Students can only voluntarily pay attention to their own career planning and the value of cultivating innovative and entrepreneurial talents by being truly made to make college teachers and students understand the value and significance of innovation and entrepreneurship education from a deep level, in teaching practice [11]. Yan et al. show that the lack of career planning and talent training in institution of higher learning is the direct cause of employment difficulties; especially, since the enrollment expansion of the institution of higher learning, the employment situation has become more and more severe. Whether the employment problem of university students can be effectively solved directly affects the stable development of China's higher education in the future and even the stability and harmony of Chinese society [12]. Qin et al. show that college students' career planning education helps college students to correctly understand and analyze themselves, understand their career needs from various angles, cultivate their ability of independent planning and entrepreneurship, and guide college students to realize their career, establish their career development goals, choose their job roles, and choose specialized courses that are in line with the most reasonable development path [13]. Wang show that career planning plays an important role in mechanical university students, and the quality of career planning will definitely affect their whole life course. Success and failure, in fact, are the realization of the set goals, and the main factor that determines success or failure is the goals [14]. Frank et al. think that career education and the cultivation of innovative and entrepreneurial talents are not comprehensive and systematic. Only a few employment guidance courses are held at graduation, which cannot meet the needs of students' career development and the cultivation of innovative and entrepreneurial talents, and provide comprehensive guidance. Without really solving the fundamental problems in students' career development, they can only treat the symptoms rather than cure the root cause and even less treat both the symptoms and root causes [15]. Engel et al. show that "focusing on the development of students" should promote the development of career planning and the cultivation of innovative and entrepreneurial talents through the combination of all-round development and development of individuality, scientific spirit and humanistic spirit, theory and production practice, doing and being human, inheritance, and innovation, and developing intellectual and nonintellectual factors [16].

2.2. Methods and Contents of This Study. In accordance with the principle of fusing theory and practice, this paper begins by reading, gathering, and analyzing pertinent literature and materials. It then uses a combination of field investigation and data research, analysis and induction, theory, and practice to come to the proper conclusions and viewpoints. It mostly uses research techniques such as observation and analysis, literature searches, comparative studies, and other types of theoretical and empirical study. In order to address the present issues with career planning and the development of inventive and entrepreneurial abilities, this study focuses primarily on how to strengthen these processes.

In response to the pressure on employment that university students are experiencing, it offers suggestions and ideas from the perspective of college education and training and develops innovative talent training methods to improve students' employment ability to reform the college talent training mode so that university students can complete their education and training during their time in school. It also continuously improves the employment ability to adapt to the current challenging employment environment. We will create a setting where university students may experience innovation and entrepreneurship with the aid of technology, support them vehemently as they put their theoretical understanding of the subjects into practice, and give talent assurance for the development of a creative nation. We will boost graduate employment while providing comprehensive career planning instruction. Therefore, in light of the dire employment situation, it is especially crucial to use application technology to set career goals, achieve career planning, and successfully employ innovative and entrepreneurial talents. It is also crucial to figure out how to further strengthen university students' career planning education, improve their employment competitiveness, and encourage the corresponding employment of students.

3. Research Method

3.1. The Necessity of Career Planning Education and the Cultivation of Innovative and Entrepreneurial Talents. The career planning and design of higher vocational students should start from the entrance and run through the whole process of the whole college stage. Due to the complicated source of higher vocational students and poor psychological quality, after entering the university campus, many students no longer have the pressure of the college entrance examination, so they can fully relax themselves and begin to enjoy college life [17]. The orientation of talent training in higher vocational education comes from two aspects: one is the orientation of ability and the other is the orientation of training activities. The orientation of students' ability is based on the needs of career development and is determined based on the social work environment and humanism. Although in recent years, some newly built local undergraduate institutions of higher learning have also taken the banner of cultivating application-oriented talents, they still follow the development path of cultivating academic talents. Therefore, for the university of applied technology, it should change its ideas and concepts from the source in the specific mode of talent training, update its educational concepts, and scientifically understand and accurately grasp the essence and laws of the training of applied talents. The orientation of talent training activities is to realize the ability of career development, including training objectives, training contents, training process, and evaluation process. University students can conduct accurate professional analysis by using the methods and tools of scientific cognition to gain a thorough understanding of their professional interests, temperament, personality, ability, and other traits. They can also understand their advantages and strengths as well as their weaknesses. As indicated in Figure 1, professional ability, method ability, and social ability are among the skills needed for career advancement.

The theoretical research and practice of talent training mode first appeared in general education, and then, this traditional training mode was used in the initial stage of school-based vocational education. With the improvement of industrial progress and social production's requirements for workers, vocational education urgently needs to change the traditional talent training form, and a large number of educational thoughts and theories with vocational education characteristics have emerged as the times require, including teaching methods and training modes related to social work [18]. When evaluating the overall proportion of simple random sampling, the sample size is used to calculate the predicted main findings for various scale data, as well as the comparison results for various scale data. Use the general formula:

$$n = \frac{Nt^2 p}{\Delta_p^2 N + t^2 p}. \tag{1}$$

Formula (1) is calculated according to the requirement that the absolute error of sampling should not exceed 5% with 95% confidence; that is, the sample size should be as follows:

$$n = \frac{Nt^2 p(1-p)}{\Delta_p^2 N + t^2 p(1-p)}. \tag{2}$$

Then, the coefficient for the sample set is defined as follows:

$$\text{Gini} = 1 - \sum p_A^2. \tag{3}$$

Among them, the smaller Gini is, the higher the purity of the subset produced by branching.

Then, the Gini coefficient based on this division is as follows:

$$\text{Gini} = \frac{C_1}{C} \times \text{Gini}. \tag{4}$$

The process will culminate in the construction of a finite ordered subtree sequence with diminishing node numbers. Its measurement is written as follows:

$$Ra = Ra(M) + a, \tag{5}$$

where M is the number of leaf nodes of the tree, a is the complexity parameter, and $Ra(M)$ is understood as the composite cost of the sum of the weighted misclassification rate of the tree and the penalty value of complexity.

The establishment of talent training objectives not only is of directional significance to the talent training of a school and a major but also serves as a connecting link to a certain extent. From the above, it must reflect the overall development direction specified in the national education policy, and at the same time, it must meet the fundamental requirements for personnel training in the educational objectives [19]. They possess not only a good theoretical basis but also a wide range of professional knowledge, strong practical skills, high levels of thoroughness, and the capacity to apply and convert scientific and technological information. The university of applied technology should simultaneously abandon the conventional method of talent development, scientifically assess the level of its own talent development, reform the training curriculum, experiment with new training approaches, and ultimately cultivate high-caliber, application-focused talents. Adjust the career planning correctly during the implementation phase in response to changes in the real world to keep it relevant. Develop their ideal job over time by focusing on social needs and professional training goals before deciding on the goals that are best for their own development.

Setting realistic and doable professional goals is essential to creating career planning since it controls career development behaviour and outcomes. The purpose of talent development is the concretization of educational goals, and the curriculum and teaching goals are the concretizations of the methods used to achieve the training goals. As a result, it is crucial in tying the previous and subsequent together. Different schools have different talent training tasks. Therefore, the formulation of talent training objectives should not only be based on certain social and economic development and political and cultural background but also consider the level and position of each type of school. At

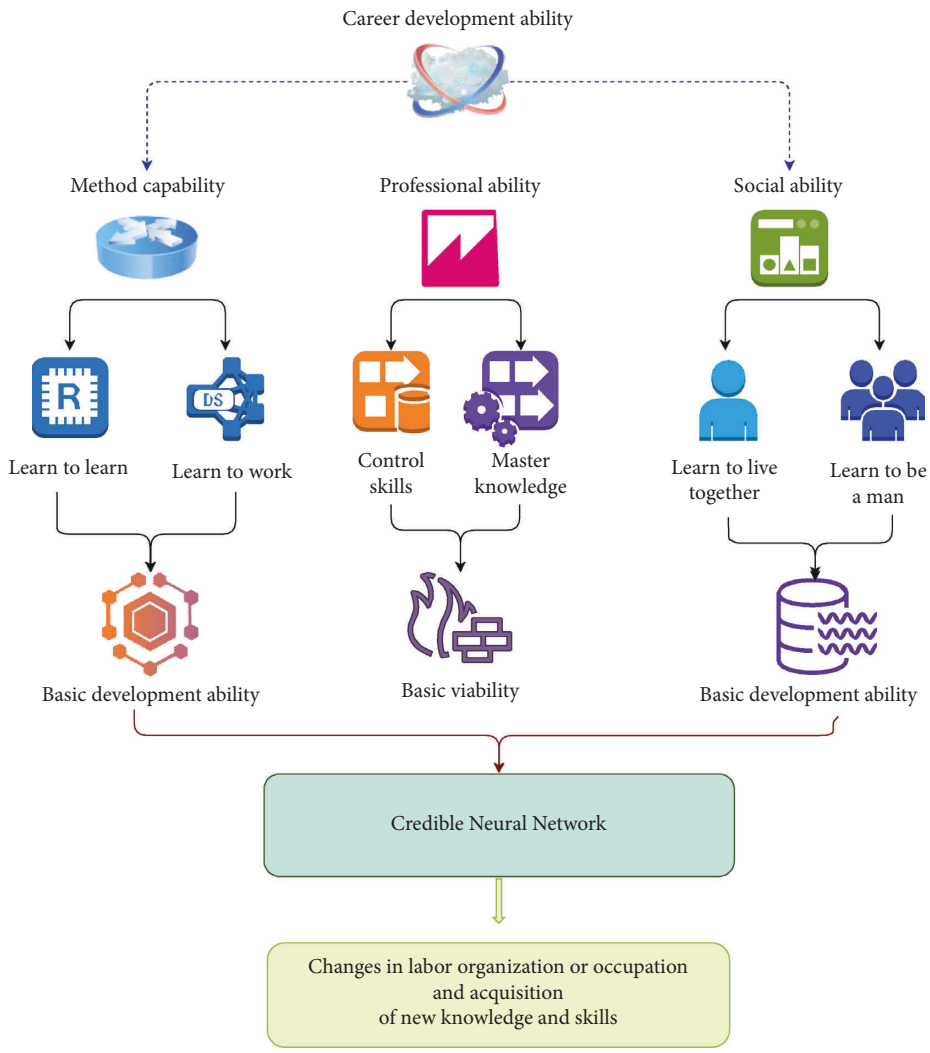

Figure 1: Career development ability.

present, the employment situation is increasingly grim. In order to achieve full employment and stand out in the competitive society, higher vocational students must improve their employment ability [20]. The acquisition of students' ability needs a reasonable talent training mode. Based on the perspective of students' career development and credible neural network, the rational positioning of talent training objectives, training content, training process, and evaluation process is a problem worth thinking about in the current university students' career planning and innovation and entrepreneurship talent training.

3.2. The Basic Path of Professional Career and Innovation Ability Cultivation under the Application Type. The cultivation of university students' innovative ability involves value orientation, a humanistic environment, social mechanism, and educational guidance. It is a complex systematic project, which needs the participation of families, schools, government, society, and other parties. As far as higher vocational colleges are concerned, the cultivation of talents' innovative ability needs to update educational ideas, create innovative atmosphere, strengthen specialty construction, deepen teaching reform, cultivate innovative consciousness, stimulate teachers and students' enthusiasm for innovation, and pay attention to innovation system guidance. Under the fierce social competition, university students should strive to find a career that suits their actual situation. First, university students should make a career plan at the university stage to prepare for their own career development. University students must make a scientific career plan. As far as the goal of talent training is concerned, if it is not specified from the specific specifications of talent training, then the operability will not be strong, resulting in the whole process of education not being well controlled. Therefore, it is of great practical significance for universities and other institutions to make a reasonable positioning of talent training specifications in the process of education. Vocational institutions of higher learning should focus on the cultivation of professional awareness, cultivate their own professional development ability, lay a solid foundation for employment, and prepare for the all-round development of people.

Therefore, carrying out career planning education is convenient for university students to adapt to the workplace and can also adapt to the development of society and accept the challenges of social reality.

At the stage of college entrance education, it is necessary to consciously guide students to make career planning, to guide them to know more about the industries they are engaged in the enterprises in the industries and the related jobs and occupations, and to have a clear understanding of the basic situation of the related industries and enterprises, the current development trends of the industries, the operation modes of the industries, and the role of the industries in social life. Shaanxi applied technology specialty which has the characteristics of a "new specialty, big difference in technical categories and long industrial chain." Through in-depth analysis of professional posts and market demand for talents, we actively promote school-enterprise cooperation, determine the training objectives of professional talents, and build a professional system of Shaanxi applied technology based on post groups. Shaanxi applied technology is applied to vocational and technical colleges, and the "training scheme of professional talents based on innovative ability" is designed and practiced, and its structure is shown in Figure 2.

Professional reform, the development of talent innovation consciousness, and the creation of innovative works, skills, and awards in innovation competitions have all seen significant advancements. The university's learning planning is distinct from career planning. While career planning is a design that continues throughout a person's life and varies with the passage of time and environment, academic learning planning is limited to the planning and design of the university stage. The frequency of occurrence in the containing transaction is determined by the frequency of a given dataset and the confidence. These are the definitions of the support and confidence measurement types:

$$\begin{aligned} \text{Support} &= \frac{\sigma(A \cup B)}{N}, \\ \text{Confidence} &= \frac{\sigma(A \cup B)}{\sigma A}. \end{aligned} \tag{6}$$

The conditional mutual information between each pair of attributes is calculated through the training set:

$$I\left(X_i, X_j\right) = \sum_{x_i, x_j} P. \tag{7}$$

Select the class label that maximizes the posterior probability:

$$c = \arg\max \frac{P\left(x_{i1}, x_{i2}, \ldots c_j\right)}{P\left(x_{i1}, x_{i2}\right)}. \tag{8}$$

The process will be more clearly described in the form of a program as follows:

$$\begin{aligned} &\text{For } i = 1 \text{ tom}, \\ &\text{For } j = 1 \text{ to } C. \end{aligned} \tag{9}$$

We will implement the project-based teaching method of "task driven and integration of theory and practice," establish innovation platforms such as "professional studios" and "professional associations," implement the open system of "experimental training rooms," give consideration to the connection and linkage of the three classrooms, constantly cultivate students' innovation consciousness, and improve their innovation ability. In the process of career planning, career planning is the result of the interaction of the external environment, its own characteristics, social environment, political economy, and other factors, which will cause continuous changes and changes in career development. The institution of higher learning establishes career planning files for university students through the application of technology. The institution of higher learning should classify and archive the comprehensive quality assessment, vocational training, professional skills mastered by exhibition students during the school period, career suggestions given by career planning experts, professional tutor comments, and other materials, so as to provide a scientific basis for employers to better select suitable talents. Graduates of the university of applied technology can adapt to the transition from school to work more quickly, have better professional quality, and get higher salaries after graduation. Enterprises also prefer to hire graduates of the University of applied technology because they have already acquired the skills and practical abilities required by their posts, thus, improving the effectiveness of talent training at the University of applied technology.

4. Results' Analysis and Discussion

In this experiment, taking electronic information engineering as an example and facing the important strategic position of the electronic information industry in a city, a university realized that a number of large-scale enterprises engaged in the information industry have great demand for such talents, and the good development of the industry is crucial to economic development. The experiment is based on the proportion of each course credit in the total credit in the talent training program of a university in 2020 and 2021. The proportion of credits of each course in the total credits in the talent training program of a university is shown in Table 1.

It can be clearly seen from Table 1 that there is basically no major change in the curriculum, but the general courses and basic courses are the main ones, focusing on cultivating students' basic abilities. Although the school advocates the curriculum of "broad foundation and emphasis on practice," the proportion of independent practice courses is basically unchanged compared with before. Compared with before, some of the original courses have been set up as innovation and entrepreneurship courses, which increases the number of weeks of students' graduation practice.

In the process of curriculum development, we should actively advocate the cooperative development of courses by industry and enterprises, promote the effective connection between the curriculum content and the demands of

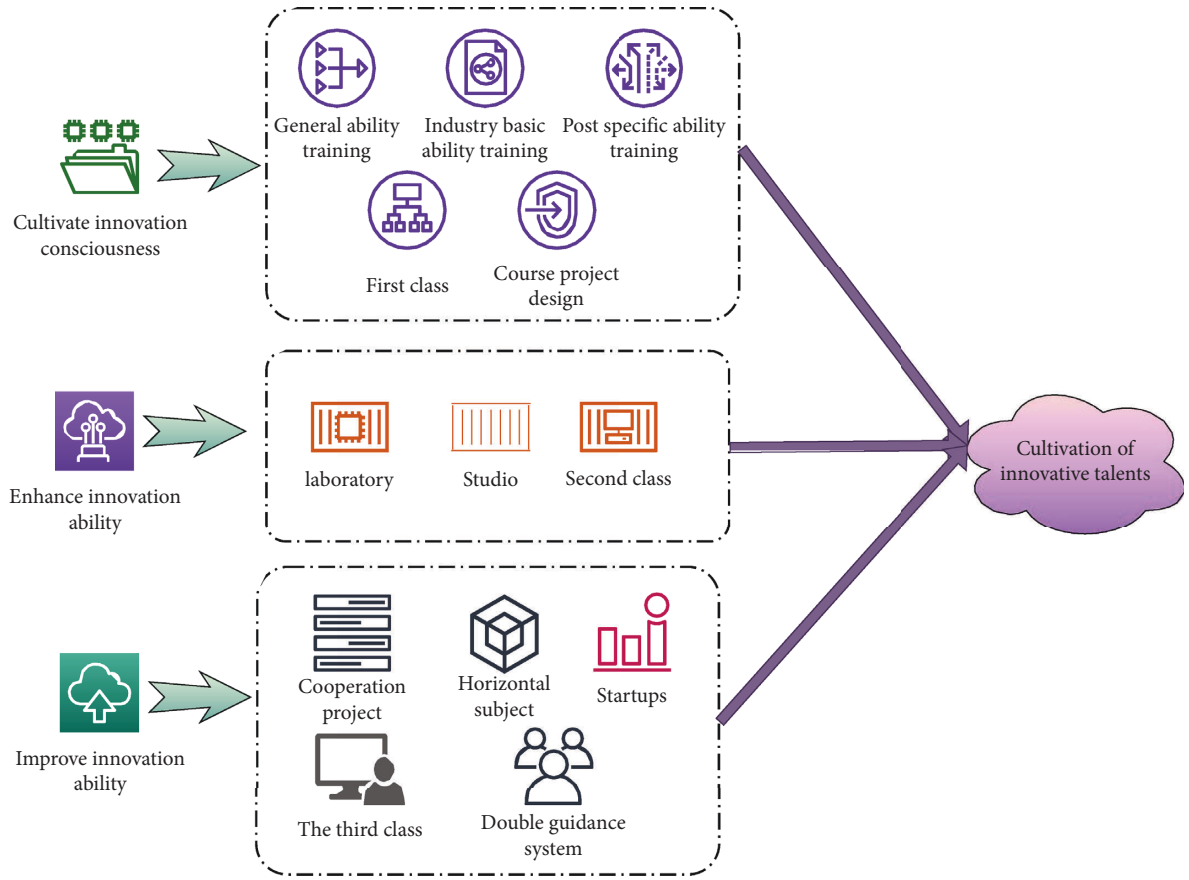

Figure 2: Structure chart of professional personnel training of Shaanxi applied technology innovation ability.

Table 1: Proportion of credits of each course in a university's talent training program to total credits.

Course name	The proportion of total credits in 2020	The proportion of total credits in 2021
Basic course of subject	16	16
Professional elective	4.6	4.7
Specialized courses	6	9
Professional basic course	14	13

professional posts, so as to enhance students' professional adaptability, and enable them to have the skills needed for future professional posts. Among them, the curriculum system of innovation and entrepreneurship is constructed in the quality development course. The proportion of credits of each course in the talent training program to the total school is shown in Table 2.

When asked about the students' understanding of the requirements for talents in the numerical control industry, it can be seen from Figure 3 that average 55.55% of the students expressed "general understanding" and "very understanding" and "not understanding" accounted for 26.15% and 35.5%, respectively. It can be seen from Figure 4 that, in response to the question "do you think the future employment prospects of the technology major are good," 54% of the students think that the employment prospects of the technology major are good, 30.15% of the students think that the prospects are bad, and 44.8% of the students do not know about the employment prospects of the technology major. This shows that even though most of the students understand the clear learning objectives in the teaching process, the degree of connection between the learning objectives and the work is not high, and the students do not know much about the market situation of their major so that most of the students in grade three still do not know the future career direction. It can be seen from Figure 5 that when asked about the "career direction most willing to engage in in the CNC industry," only less than 22.75% of the students choose "technical personnel," 46.6% choose "management personnel," and 31.55% choose "entrepreneurship," which is inconsistent with the original intention of the school to train "grey collar" technical personnel.

According to the statistical data in Table 3, we found that the talents with bachelor's degree or above accounted for 14%, the talents with junior college level accounted for

Table 2: Proportion of credits of each course to total credits in the talent training program of a university.

Course platform name	The proportion of total credits (before the reform)	The proportion of total credits (after reform)
Subject platform course	19–41	15–21
Quality development course	4–6	4-5
Public basic course	28–52	24–32
Professional courses	13–30	11–21

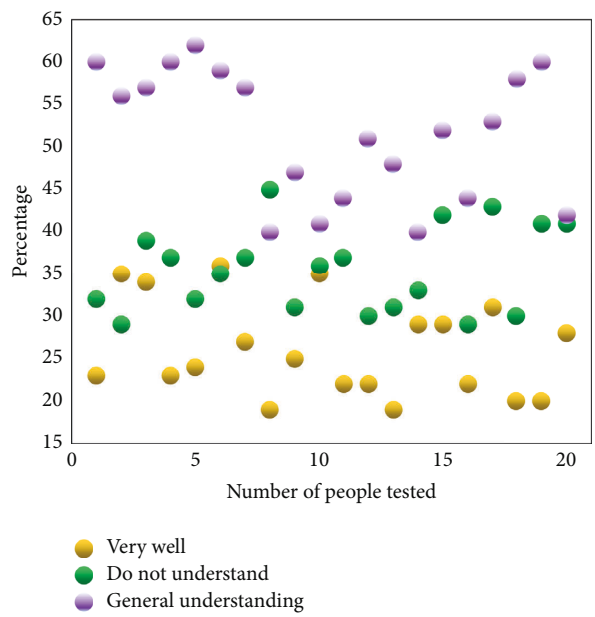

Figure 3: Students' understanding of enterprise talent ability requirements.

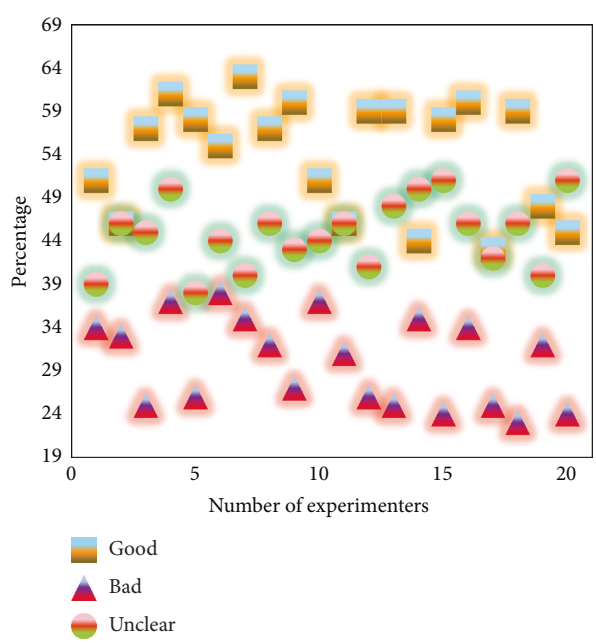

Figure 4: Students' cognition of occupation.

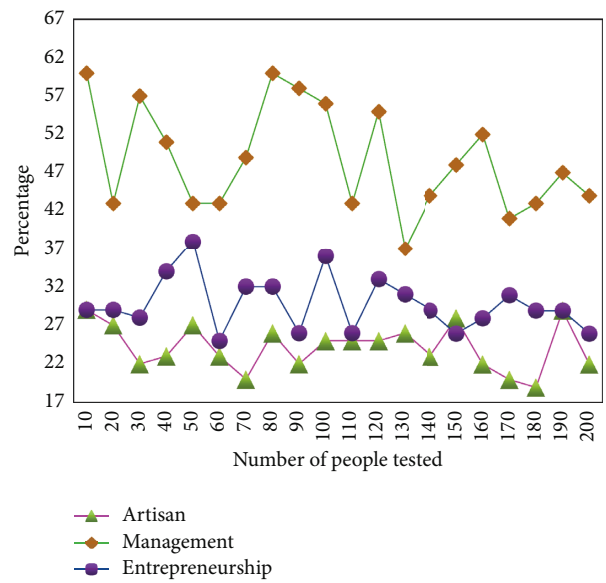

Figure 5: Students' career development intention.

39.6%, and the talents with technical secondary school and below accounted for 47.1%. It can be seen that China's higher vocational and technical education still has a large development space in personnel training.

In response to the question "is the frequency of professional practice in enterprise workshops high, and is the connection between enterprise practice and school training high?", as shown in Figure 6, it can be seen that 41.6% of the students think that the frequency of professional practice is "low," and only 27.4% of the students think that it is "high." On an average, 18.53% of the students think that the degree of connection between school training and enterprise practice is high, and the students think that the degree of connection between school training and enterprise practice is low.

In this experiment, the accuracy of theoretical knowledge is compared. This experiment adopts big data, data mining, and Shaanxi application technology. The experimental results are shown in Figure 7.

It can be found from Figure 7 that, among the three methods, the highest accuracy rate is Shaanxi application technology in this study. According to the trend in Figure 7, the highest accuracy rate can reach 78.3%, followed by data mining, with the highest accuracy rate of 62.9%, and finally big data, with the highest accuracy rate of only 46.7%. It can be seen that this method is more suitable for judging the accuracy of theoretical knowledge.

Table 3: Statistics of personnel training status.

Survey area	Education status				Job type			
	Bachelor's degree or above (%)	Undergraduate (%)	Specialty (%)	Technical secondary school and below (%)	Programming (%)	Repair (%)	Operation (%)	The above can be engaged in (%)
Northeast	1.3	17.9	48.9	32.0	13.3	16.8	69.8	0.3
Southwest	1.7	12.3	29.3	57.1	12.9	13.2	74.2	2.1
East China	0.8	6.8	40.6	52.2	12.9	20.1	62.2	5.7

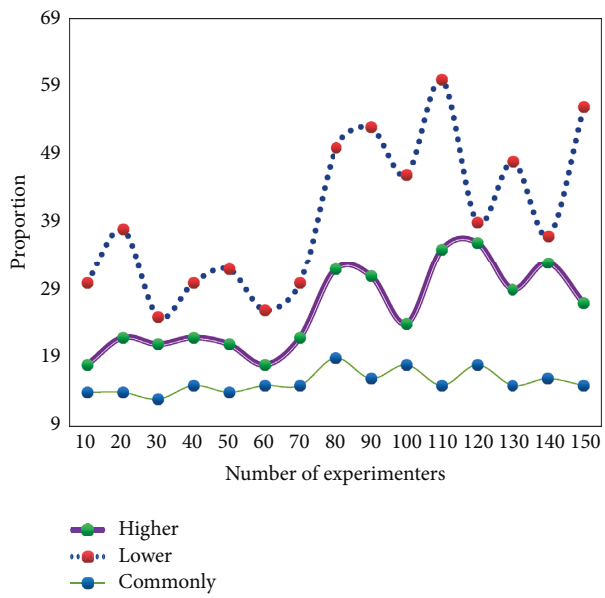

Figure 6: Enterprise practice.

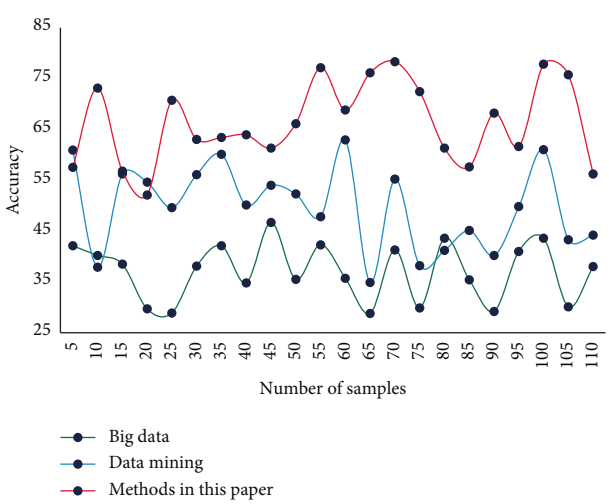

Figure 7: Changes in difficulty and accuracy of theoretical knowledge.

5. Conclusion

The design of a university student's future career development course is based on their unique traits, opportunities, and limits. It is an action plan to identify career development paths, determine learning plans, training programmes, and development plans, as well as to determine career direction and goals. The target requirements for fostering the sustainable development of applied technology institutions are to increase the quality of talent training by ensuring the quality of talent, developing an effective monitoring system, and providing effective external support. As a result, this essay investigates career planning, innovation, and entrepreneurship talent development from a Shaanxi applied technology perspective. The study demonstrates that the Shaanxi applied technology has the highest accuracy rate out of the three approaches in the paper. The maximum accuracy rate can reach 78.3%, data mining has the highest accuracy rate at 62.9%, and big data has the highest accuracy rate at just 46.7%, according to the trend in the graph. It is clear that this approach is more suited for determining how challenging and precise theoretical knowledge is. The goals, prospects, and pathways for the university's development can be established through the planning of scientific application technology. The curriculum system, teaching system, and personnel training quality evaluation standard of applied technology personnel training are all discussed in detail and in depth in this study in the hopes that the majority of scholars will be interested in these subjects.

Data Availability

The data used to support the findings of this study can be obtained from the corresponding author upon request.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

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Research Article

Optimization Model of Employment and Entrepreneurship Guidance for University Graduates Using Credible Neural Network and Spark Big Data Technology

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China's economy has grown significantly since the turn of the century, and its domestic situation has become more stable. The employment and employment issues that college graduates encounter across the nation, however, demonstrate the opposite tendency. The general public's attention has turned to "difficulty in getting employment," which has emerged as a crucial component of the overall social employment problem. Additionally, it examines the environment and elements that influence college students' employment, such as the social, economic, and policy elements as well as the university, employer, and individual elements. This study examines the development of college students' entrepreneurial service system by using colleges and universities as the research object and integrating theoretical analysis with empirical research. The M Apriori technique is then parallelized using a Spark and Credible neural network-based approach. This solution makes full use of Spark's benefits based on in-memory processing and data item RDD storage by adopting data parallelism and a local rather than global strategy. The M Apriori algorithm is parallelized and ported to the Spark platform for parallelization, enhancing Spark MLlib. The simulation test and analysis are completed in the end. The study's findings demonstrate the algorithm's excellent accuracy, which is 8.65% greater than that of the Apriori method. Finally, the experimental findings demonstrate the effectiveness of the method used in this paper.

1. Introduction

The service system has evolved from information acquisition and meeting the fundamental needs of communication and entertainment to personalized or customized services that integrate and link social, medical, educational, transportation, and other services with the introduction of the "Internet +" action plan, the rapid development of Internet and Internet of things technology, and the arrival of the cloud era [1, 2]. Local regular colleges and universities have given local college students and graduates the necessary support and services to encourage and assist them in starting their own enterprises. This type of necessary guidance and service is a major strategy and measure put forth by the major universities for the construction of an innovative nation at this stage. It is a crucial step to strengthen the teaching reform of higher education, foster the inventive spirit of college students, and develop their practical ability. It is also a necessary way to encourage college graduates to increase their employment levels [3].

In the national network video conference on the employment of ordinary college graduates, Yuan Guiren, Minister of Education, stressed that "doing a good job in the employment of college graduates is conducive to building a strong country in human resources, ensuring and improving people's livelihood, and promoting the sustained and healthy development of higher education." Therefore, it is of great significance to solve the employment problem of college graduates. The entrepreneurship service industry is an emerging industry. It mainly provides highly systematic innovation and entrepreneurship services for entrepreneurial enterprises, covering multiple functional elements such as maker space, incubator, accelerator, entrepreneurship coffee, and entrepreneurship community, as well as

entrepreneurial activities with rich content and high-frequency words, to create an entrepreneurship service ecosystem [4]. Therefore, the entrepreneurship service industry is of great significance for the country to promote innovation and entrepreneurship economic development mode. However, due to the restriction of domestic economic development level and the obstacle of social ideology, the innovation and entrepreneurship service industry has been developing for 20 years before it began to break out at the beginning of this century. Thousands of innovation and entrepreneurship service enterprises of different types emerged, ranking first in the world in terms of number, providing a good growth and development platform for entrepreneurial enterprises in all walks of life [5]. But since China's economy as a whole lagged behind in its development, a sizable amount of the country's GDP still comes from an economic structure dominated by heavy industries and agriculture. In light of this, it is extremely challenging to alter the economic structure and style of development through "mass innovation and entrepreneurship." As a result, the growth of the innovation and entrepreneurship service sector is also challenging. Although there are more businesses in the industry, a significant number of businesses have also vanished due to intense rivalry [6].

The state administrative departments at all levels successively released the State Council's opinions on further doing a good job in employment and entrepreneurship under the new situation, the Ministry of Education's notice on doing a good job in employment and entrepreneurship of graduates of regular colleges and universities in the 20th century, and the notice of the general office of the Ministry of Education on carrying out and utilizing the "Internet +" new employment mode to its fullest extent to create a precise docking service platform for supply and demand through employment networks, mobile phone SMS, employment apps, Wechat, and other channels, compare the database of graduates' job search intentions with the database of employers' job demand information, intelligently match key information like education, specialty, and region, and accurately push the necessary supply and demand information for graduates, providing college graduates with correct docking services, policy, and direction [7, 8]. The most active and reliable source of employment is entrepreneurship. According to a poll conducted by the organization for economic cooperation and development, all of the employment opportunities in society are provided by entrepreneurs and small- and medium-sized business owners. They will increase wealth and offer society immeasurable employment prospects if they can continue to encourage entrepreneurship and the growth of small and medium-sized businesses [9]. Entrepreneurship is crucial for boosting the economy and generating job opportunities. The most revolutionary factor driving future economic and social progress is entrepreneurship [10]. A number of assistance programs have been released by the Chinese government at all levels and numerous colleges to encourage some college students to find jobs through self-employment. Entrepreneurship among college students is becoming a significant method and approach for increasing student employment. Additionally, existing data demonstrates that, in terms of promoting entrepreneurship in China, college students have an entrepreneurship rate of just about 2% and entrepreneurial motivation that is lower than that of middle-aged individuals. College students' entrepreneurship has been hampered by their lack of a concept of independent entrepreneurship, inability to think independently, imprecise entrepreneurial goals, scarcity of original entrepreneurial ideas, and inadequate market knowledge. Its ingenuity lies in the following.

The starting point of this study is based on the guarantee system of college students' independent entrepreneurship in local colleges and universities. From the perspective of research, there are still few scholars who pay attention to this issue, and there is a lack of complete theoretical construction for the service system of college students' independent entrepreneurship. And the previous studies are all on the macro level. The research of this paper focuses on the implementation of policies, which is more targeted.

2. Related Work

At present, group computing based on the man-machine cooperation mode is still in the stage of research and development. Group computing tasks often cover various professional fields, so it is necessary to adopt reasonable strategies to use network platforms, Internet users, and other group resources to accomplish computing tasks together. Therefore, the focus of group computing is to study the task allocation strategy. The traditional allocation strategy adopted by group computing is just to randomly allocate tasks. However, in the real big data application environment, Internet users are virtual and complicated and have different knowledge backgrounds and credit degrees. The random allocation strategy cannot satisfy the dependence of group tasks on knowledge.

Chen et al. proposed to "promote employment through entrepreneurship," and local governments and universities actively responded and cooperated. Various entrepreneurship education and training centers, entrepreneurship bases, and incubation parks have sprung up one after another to encourage college students to start their own businesses. However, the current situation of entrepreneurship among college students in China is still not ideal [11]. Liu proposed optimizing the distribution mode in combination with the ant colony algorithm. The optimized population calculation can give corresponding positive and negative feedback to the final distribution result. However, the ant colony algorithm is easy to reach the local minimum value in the case of large data volume and cannot finally obtain the optimal distribution strategy [12]. Gonzalez Roma et al. expounded the basic contents of the employment service system for Chinese graduates, pointing out that the system is mainly composed of the Ministry of Education, the Ministry of Human Resources and Social Security, and its employment service departments such as talent exchange service centers at all levels, universities, and vocational intermediary agencies and aims to complete the information collection of college graduates, build an employment information platform,

conduct professional vocational consultation and vocational education, strengthen skills training, and provide employment practice. Improving management services such as social security for graduates has laid a foundation for further research on the employment service system for college graduates in China [13]. Fini et al. put forward suggestions for improving the employment service system of college graduates in China from the perspective of management departments. They believe that the role of the Ministry of Education and other administrative departments should be fully brought into play to transform government functions [14]. Addario and Vuri pointed out that the focus of the improvement of the employment service system for college graduates in China is to form an effective information transmission and feedback mechanism among relevant administrative departments through the establishment of a talent network database covering all colleges and universities across the country and give full play to the role of various departments [15]. Suddaby et al. focus on the study of the mode of employment service system for college graduates in China. According to the research, the existing system focuses on vocational training and employment ability training, establishes an information platform, and implements the multibody system of school leadership, government guidance and support, enterprise participation, and student learning and practice, which jointly promotes the establishment of the employment system for college graduates in China [16]. Kang and Xiong believe that private colleges and universities should take the professional characteristics of students as the basis and establish a perfect employment guidance curriculum system to make the employment guidance curriculum run through the career of college students. She emphasized the importance of employment guidance teachers with professional skills, which can enhance the practical operation ability of students through practical teaching and complete the training objectives of employment guidance courses in private colleges [17]. The definition proposed by Zhao et al. has been accepted by more and more people. They believe that entrepreneurship is not only the creation of a new enterprise but also the successful operation of a new enterprise after its creation, that is, entrepreneurship within the company [18]. Cheng et al. proposed a task assignment algorithm based on game theory to detect the accuracy rate of task completion by people with the same professional background and knowledge level and solved the problem of group task assignment for users with the same level of knowledge and professional background. However, these two task assignment methods still have the problem of low assignment accuracy [19]. Chen proposed an improved user theme perception iterative group computing model based on "crowdsourcing." This model uses a large number of task testing questions to iteratively detect the professional background of different users and the accuracy rate of completing tasks and assigns tasks of corresponding topics to users with a full understanding of their real themes and accuracy. This model overcomes the difficulty of random assignment mode, However, the model still has some defects such as low accuracy, high cost of task testing, and unstable extraction for different topics [20].

3. Methodology

3.1. Research on the Service System of College Students' Entrepreneurship. As early as the 1980s, a few college students started their own businesses in China. Only because of the influence of the objective environment, at that time, the number of college students in China was small, and they were scarce talents. With academic qualifications as the guarantee, their entrepreneurial situation and prospects are very good. In recent years, the large-scale enrollment expansion of major universities in China for many years has led to a sharp increase in the number of college students. However, the market demand has not changed fundamentally, and the employment situation is becoming more and more serious. As a part of the entrepreneurial army, college graduates, compared with ordinary workers, have relatively more systematic and solid professional knowledge, have a stronger comprehensive ability, and can find, establish, and use a relatively complete social resource chain. They have fully possessed the basic abilities required to become an excellent entrepreneur, but they still need further training in psychology and experience. College students' independent entrepreneurship is a process in which college students make rational use of college and social resources, through individuals or teams, with the help of innovation consciousness, seek development opportunities, and constantly grow and create value. In this process, many college students have no enthusiasm, and few can put their ideas into practice. Among the few who put them into practice, many entrepreneurs have low scientific and technological content, can not keep up with the development of the times, and are washed away by the waves.

College students are a relatively special group in the labor market. In the broad sense, they include all college students with a college education or above. In the narrow sense, they only refer to the general students and students with the same education, and the choice and implementation of careers in social occasions. College students' employment is distinct from regular employment in some ways. (1) Specialization: when compared to the employment of regular people, college students are significant human resources, and their labor market is a talent market. Consequently, special career fairs are frequently conducted for recent graduates. (2) For the first time, college graduates are employed for the first time after they have completed their studies. The forms include formal confirmation of work units or admission to graduate students before leaving the university, obtaining double degrees, upgrading from a junior college to an undergraduate, studying abroad, and working abroad. (3) Timeliness: college students usually graduate in June and July of each year. This period and the time before and after it often become the golden period of employment. Once they fail to get employment, they often need to wait for opportunities in the coming year. (4) Mass, with the continuous expansion of university enrollment, more and more college students enter the market for employment every year, and a large-scale group has been formed. Once a large-scale group is difficult to find employment, it will bring many social problems. Colleges and

universities are the main body of employment guidance service work, and college students are the object of employment guidance service work. Employment guidance, professional guidance, career planning, and entrepreneurship guidance are the main contents of the employment guidance service system. Personalized guidance, internship practice, psychological consultation, follow-up investigation, and information service form a complete employment guidance service system, as shown in Figure 1.

As the main body of graduate employment guidance services, each university has set up a special graduate employment service institution "Employment Guidance Center" and arranged full-time staff to be responsible for the employment management of graduates. The organization mainly arranges the employment guidance courses of the school, conducts employment consultation, organizes recruitment propaganda, and collates and publishes employment information, employment policy consultation, and employment formalities. The series of campus activities are closely related to the employment guidance service, such as understanding the employment situation, cultivating the awareness of innovation and entrepreneurship, designing career planning, learning professional knowledge and skills, participating in social practice, conducting psychological counseling, participating in enterprise recruitment, and signing employment contracts. The employment guidance service helps college students prepare for employment in terms of ideology, concept, psychology, and ability, so as to help graduates improve their employment efficiency and success rate more effectively.

3.2. Task Assignment Algorithm Based on Big Data Population Computing. The software architecture of the employment service system adopts the B/S architecture mode. The system develops system functional modules in the form of plug-ins based on the dtcms open source content management system developed by Shenzhen power QIHANG Software Co, Ltd. The dtcms system is a lightweight architecture, and the system framework adopts the typical h-tier architecture, suitable for small- and medium-sized information and enterprise stations. Different channels can be independently established according to user needs, and plug-ins can be inserted and dialed to make expansion easier. This method designs the whole process of task assignment. Before assigning a calculation task, the task submitted by the publisher is modeled and preprocessed. At the same time, the real theme of the receiver and the accuracy and integrity of the corresponding theme are modeled. In the process of task allocation, the task matching is performed iteratively by designing a receiver that accurately perceives the subject of the computing task, so that the computing task can be more accurately allocated to the appropriate user, and the processing task is more targeted. The calculation model of user task allocation and processing based on user topic accurate perception is shown in Figure 2.

According to Figure 2, each employer has the traits of a large number and size of group computing jobs, complicated types, and wide disciplines when submitting big data analysis and processing group tasks on the "service" platform. As a result, the focus of this part is on researching and developing a task model that can handle massive data group activities in batches.

This paper chooses a clustering algorithm that can automatically determine the number of clustering categories by studying the popular clustering methods and evaluating whether they can be used for large amounts of data, whether they can handle different data types, and whether they can find different types. It is a preprocessing step that can be applied to other analysis algorithms. Studies that have already been done have shown that it can be improved on a cloud platform, which is helpful for upcoming studies. To determine the extent to which each data point is a member of a specific cluster, the technique utilized in adaptive clustering uses membership degree. When the goal function converges, clustering can be stopped, and the number of cluster centers can be determined adaptively. The main steps in the algorithm process include calculating the distance between a point and the cluster center, calculating the membership degree of each point to the center, finding the cluster center iteratively, and choosing the objective function. The following definitions describe the computation activities involved in the algorithmic process:

$$\mathrm{Dist}_{ij} = \left\| \mathrm{Task}_i - C_j \right\|. \tag{1}$$

Dist_{ij} denotes the Euclidean distance between the i task Task_i and the j cluster center C_j.

$$F_{ij} = \left[\sum_{c=1}^{k} \left[\frac{\mathrm{Dist}_{ij}}{\mathrm{Dist}_{ic}} \right]^{2/m-1} \right]^{-1} = \left[\sum_{c=1}^{k} \frac{\mathrm{Dist}_{ij}}{\mathrm{Dist}_{ic}} \right]^{-1}, \quad (c = 1, 2, \ldots, K). \tag{2}$$

F_{ij} is the membership degree of the i task to the j cluster center. Among them, c is the c cluster center, $m(m \in (1 \sim \infty))$ is the fuzzy index, and the best value is 2 according to experience.

$$\mathrm{Sum}\left(F_{ij}\right) = \sum_{j=1}^{K} F(i, j), \quad (i - 1, 2, \cdots, n). \tag{3}$$

The membership degrees from each cluster center to task i are added up as $\mathrm{Sum}(F_{ij})$. The cluster centers' number is indicated by j and k.

$$C_j = \frac{\sum_{i=1}^{n} \left(F_{ij}^{m} \cdot \mathrm{Task}_i \right)}{\mathrm{Sum}\left(F_{ij}\right)}. \tag{4}$$

C_j denotes the j cluster center. The membership degree i from the task j to the cluster center F_{ij} is calculated by formula (3), and the membership degree of the j cluster center and the membership degree $\mathrm{Sum}(F_{ij}) = 1, m$ to be satisfied are fuzzy indexes.

$$J_m = \sum_{i=1}^{n} \sum_{j=1}^{k} F_{ij}^{m} \left(\mathrm{Dist}_{ij} \right)^2, \quad (i = 1, 2, \ldots, n; j = 1, 2, \ldots, K). \tag{5}$$

The j cluster center's objective function is calculated using J_m, n, the overall number of tasks, and m, the fuzzy index.

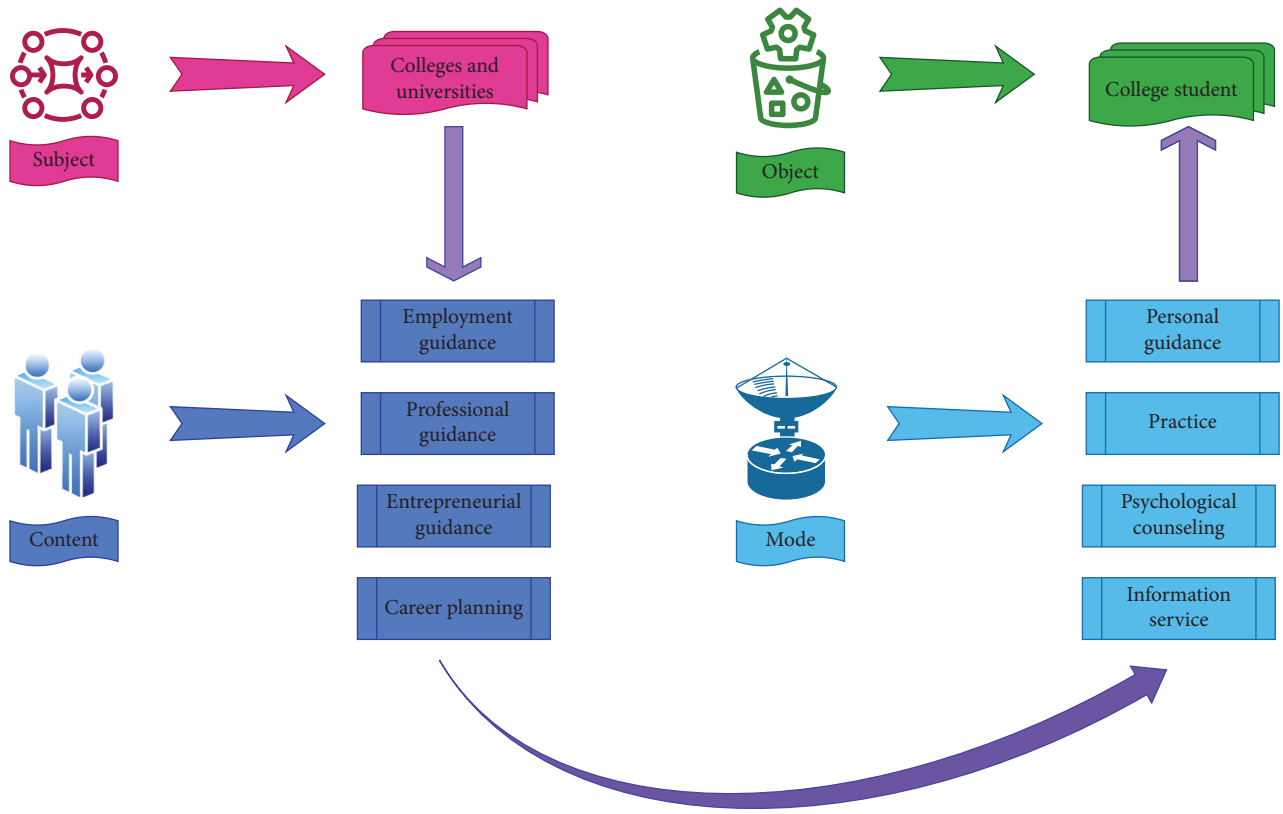

Figure 1: Composition elements of college graduation employment guidance service system.

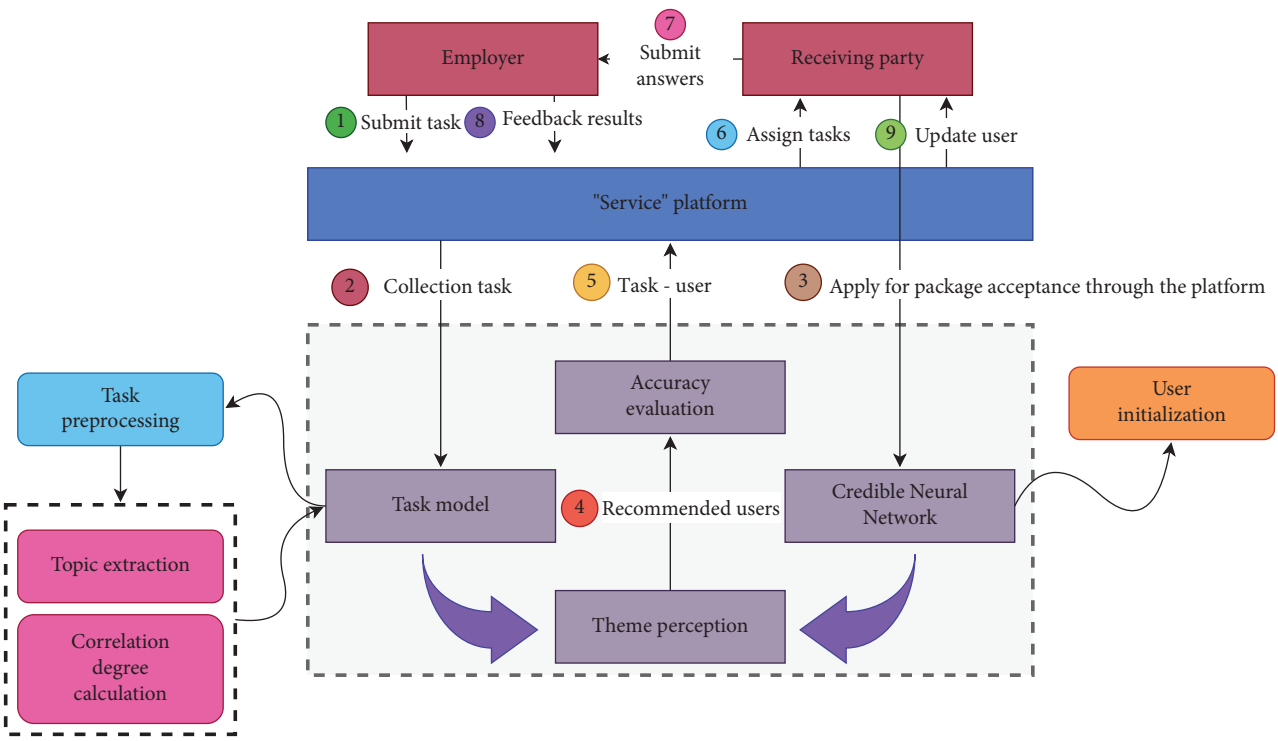

Figure 2: Flow chart of task allocation algorithm for big data group computing users.

3.3. Apriori Algorithm Optimization. Although entrepreneurship education is on the rise in China, many schools and universities have not yet fully embraced it. Therefore, the following challenges will unavoidably arise when building the entrepreneurial service system. (1) College students do not have very high levels of vocational cognitive ability. (2) University students have higher standards. (3) There is an issue with college and university talent development. (4) There are several issues with entrepreneurial education and guidance. Establishing a reliable and efficient service system for entrepreneurship and employment, as well as fostering and enhancing college students' innovative and entrepreneurial spirit and all-encompassing entrepreneurial ability, has become one of the criteria for evaluating the quality of higher education. These factors have a significant bearing on the implementation of entrepreneurship education in colleges and universities as well as the success of college students' businesses. The purpose of the entrepreneurial service system's internal guarantee system is to ensure that it operates as normal while incorporating modern, rational, and scientific management practices. Colleges and universities must start from the management, teachers, courses, students, funds, and practice bases in order to strengthen the entrepreneurship education of college students. This will help to ensure that all services are targeted and put in place in order to increase college students' entrepreneurial ability and success rate. The course is intended for a select group of college students with strong entrepreneurial potential and a strong business model. A major shift that will eventually take place is the true popularization of entrepreneurial education in the context of public education. Depending on how well entrepreneurial education is being implemented, professional-mandated courses and elective courses can be chosen. The needed courses may include theoretical ones like those for developing leadership skills, learning the fundamentals of business management, and marketing in the classroom, as well as practical ones like financial and logistics management in a company or entrepreneurship center. Finally, as a university, it should also seek and provide financial support for entrepreneurial college students in many ways and channels. It can apply for special funds, allocate funds from its own education funds, or even provide guarantees to the local government or banks for outstanding college students with bright entrepreneurial prospects and strong entrepreneurial ability, so as to avoid good projects that are not scabbarded and not tested.

When the platform distributes the group tasks submitted by the employer to the subcontractor, due to the large number of users of the subcontractor, their knowledge, wisdom, experience, and skills are different. In order to find the contractor who is suitable for executing the submission task, this paper uses user information map modeling and makes the qualified users receive the task, form the candidate sequence, then reasonably allocate the task through the proposed task allocation scheme based on topic perception, and finally complete the task. Therefore, this research needs to build a user model that can handle big data group tasks.

Due to the similarity between users, when a new user applies for receiving a package, it is only necessary to find the relevant users who have participated in the group task by calculating the user similarity μ_{user} and initialize the new user through the similarity.

Initialization of Competence and Areas of Eexpertise. Competency records the average accuracy of users' tasks on different topics. Then, the user competency is defined as follows:

$$A_i = \frac{1}{n}\sum_{j=1}^{n} A\_\text{rate}_{ij}. \tag{6}$$

A_i and A_rate_{ij} denote the competence and accuracy of the user i to complete the j subject task, and n denotes the number of subjects.

(1) When the user i has never participated in a group task, the similarity coefficient μ_{user} is calculated according to the Incomplete Attribute of the user. The more similar the user is, the closer the theme and accuracy rate are. Define the user's competence and expertise in this case as follows:

$$\begin{aligned} A_i &= \text{Max}\left(\mu_{\text{user}} \times A^{\text{Simitarity User}}\right), \\ \text{Pro}_i &= \text{Pro}^{\text{Simitarity User}}. \end{aligned} \tag{7}$$

(2) When the user i has participated in a group task, calculate the correlation coefficient task between the subtopic j task and the user's historical task, and predict the accuracy of the user's task completion through similar tasks. The user competency under this condition is defined as follows:

$$A\_\text{rate}_{ij} = \text{Max}\left(\mu_{\text{task}} \times A\_\text{rate}_i^{\text{Similarity Task}}\right). \tag{8}$$

Therefore, the accuracy rate of the initialization i user completing the task of the topic j is defined as follows:

$$A\_\text{rate}_{ij} = \text{Max}\left(A_i, A\_\text{rate}_{ij}\right). \tag{9}$$

Integrity Initialization. The user's integrity is the standard to judge whether the user can complete the task well. C_rate_i indicates the user's true integrity.

(3) When the user i has never participated in a group task, the user is given the right to participate. The initial integrity of the user is the minimum integrity threshold required by the task. Define the integrity of users in this case as follows:

$$C\_\text{rate}_i = C\_\text{rate}_{\text{need}}. \tag{10}$$

(4) When the user i has participated in the group task, the initial integrity of the user in completing the task is the accuracy of the task actually completed in history

The Ratio of the Rate to the Accuracy Rate of the Predicted Task. Define the integrity of users, in this case, as follows:

$$C\_\text{rate}_i = \frac{1}{n}\sum_{i=1}^{n}\frac{CR_i}{CY_i}, \tag{11}$$

where CR_i and CY_i, respectively, represent the accuracy rate of the actual completed task and the accuracy rate of the predicted completed task, and n represents the number of tasks.

The model is an important link in the employment service system to improve the quality of employment. Through in-depth communication with the candidate students, the employer can have a comprehensive understanding of the students. After the employer publishes the job requirements, the employer can view the resumes and other information of the students according to the recommended list listed by the system. In addition to the written materials, tsutomi allows students to upload personal style display materials and display students' learning and life, professional achievements, technical skills, etc. through pictures and videos. The employer can leave a message or send a short message to the students in the system to contact the students and can also use video interaction to further communicate.

4. Result Analysis and Discussion

The experiments used in this study are condensed and put into practice in a single-machine development environment. The efficiency of the allocation strategy investigated in this article is first confirmed by comparison experiments, and the performance of the allocation algorithm suggested in this paper is then measured in accordance with the caliber of each evaluation index in the experiment. This paper's experimental setup and software include Windows 7 + MyEclipse + Maven + Mahout API. Mahout currently offers a wide range of algorithm APIs, and many serial operation mode-based algorithms have been converted to map-reduce computing modes. This has a significant positive impact on the algorithm's data size and performance, which is crucial in large data group computing. Mahout has evolved from the Hadoop cluster platform that served as its first application platform. In addition to operating in a cluster, its technique may also be implemented in a single-machine setting.

In conclusion, the algorithm involved in the allocation strategy studied in this paper is mainly the secondary development of mahout in combination with Java, which is more optimized and more efficient than the algorithm written in pure Java. The task allocation of group computing is to use the existing "service platform" to publish tasks. In view of the complexity of the big data group computing task, the wide range of specialties, the large scale of the task, and the high dependence on cognitive reasoning technology, as well as the virtuality, diversity of knowledge structures, and rich professional levels of the users involved in the big data group computing task, this paper preprocesses the group tasks and the group users in advance and then performs simulation iteration in the task allocation process to match the users and tasks. The overall population calculation and allocation process include the following: (1) initialization of task party model, (2) receiving initialization of the task party model, (3) dynamic matching of user theme perception process, and (4) displaying the accuracy of allocation results.

In the simulation experiment, the experimental data designed above are used. First, the group task theme is obtained by the above algorithm; Since the description of each problem is composed of strings with a size of 20–100, the above algorithm is used to compare the similarity of the two strings, i.e., task similarity. At the beginning of the simulation experiment, the tasks with high relevance are divided into several sets. During the experiment, when applying algorithm 3, we consider the convergence and adaptability of tlda algorithm α, β. For the selection of values, this paper first uses the test set to find out the optimal hyperparameter value by a grid search to obtain the symmetric scalar value and then updates it according to the proposed fixed point iteration method proposed by ascensionalto obtain α, β. The values are 0.l and 0.01, respectively. When applying algorithm 4, in consideration of the rational utilization of resources, when the selected value of the critical value r of prediction classification is too high, the recall rate becomes high, making the query conditions too strict, and getting too few potential users. On the contrary, the prediction results are distorted and the resources are wasted. For this experiment, the cost is calculated by the 0–1 loss function, and the comprehensive value of R is 0.85.

This evaluation experiment mainly verifies that the task assignment algorithm proposed in this paper has better performance in accuracy and is better than the random assignment algorithm, as shown in Figure 3.

In the experiment, 200 cases of three real data sets were used, and three different algorithms were used to process the data. According to the analysis of experimental results in Figure 3, for the complete results of population calculation, the accuracy rate of the results obtained by the random algorithm is not high, which is basically between 45% and 65%, and the accuracy rate of completing wine tasks with large difficulty coefficient is significantly reduced. Through the analysis of the results of the simulation experiment under beta (5,1), it can be seen that the accuracy rate of the assignment algorithm studied in this document is better than that of the random algorithm, and the accuracy rate of completing tasks can reach about 78%, and the accuracy rate of wine task set and music task set is improved. Based on the assignment algorithm studied in this paper, the accuracy rate of completing tasks can be maintained between 75% and 85%. During the assignment process, this paper captures the possibility of completing tasks of participating users through logical regression calculation and can accurately assign tasks to participating users who are used in the background of professional knowledge in this field. Therefore, a high accuracy completion result can still be obtained on wine tasks.

This evaluation experiment mainly verifies that the task assignment algorithm proposed in this paper has good performance in task scale and scalability, as shown in Figure 4.

Three alternative algorithms were utilized in the experiment to process 50, 200, 500, and 1000 real data task sets of the car. When processing tasks of various scales, the random assignment algorithm's accuracy rate of task completion varies each time, generally falling between 45% and 65%, as evidenced by the study of the experimental

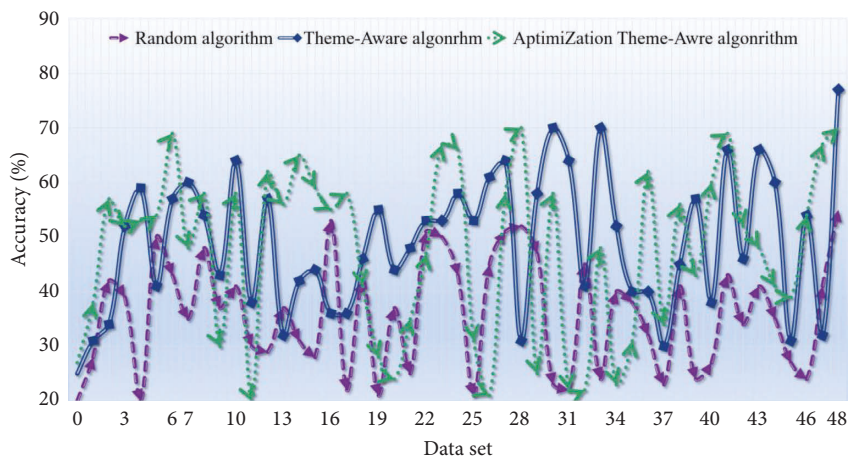

Figure 3: Diagram of simulation test accuracy on real data.

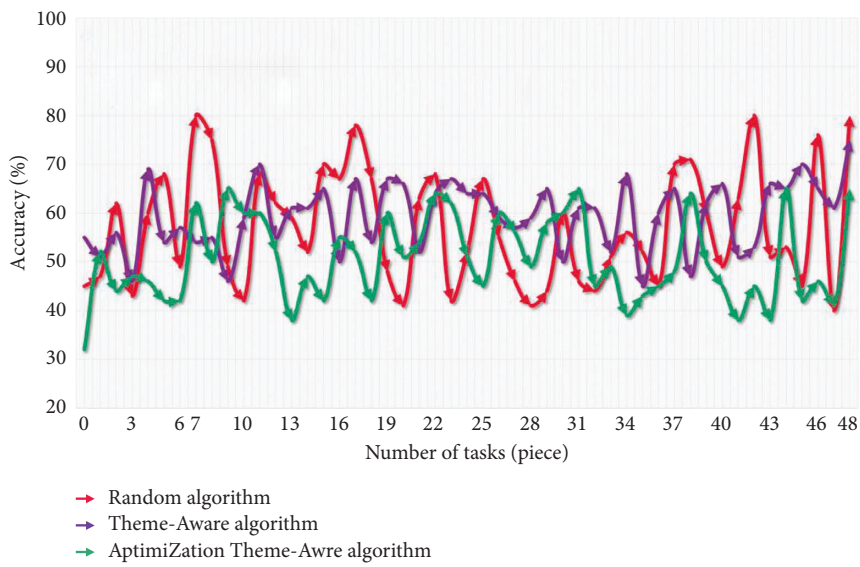

Figure 4: Accurate diagram of different task scales processed by each algorithm.

accuracy rate findings of each algorithm when the task scale is increased (see Figure 4). According to the assignment algorithm examined in this work, when the quantity of assignments rises, the topic awareness algorithm becomes fully trained, and the topic capture and user matching become more and more precise. As a result, as the job scale has grown, so too has the precision of completion, and steady results have been preserved, as shown in Figure 5.

Three related task sets of music real data, example 2, example 3, and example 4, were used in the experiment, and three different algorithms were used to process the tasks. Figure 5 shows that after completing the number of music style guessing tasks based on the music melody of example 2, the company or enterprise releases similar group tasks such as song name guessing and singer name guessing based on the music melody. On various task sets, the accuracy rate of users completing corresponding tasks changes. According to the analysis of the experimental results, it can be seen that when the random assignment algorithm is used to deal with similar tasks, the accuracy rate is still not higher than 65%, and the randomness of the accuracy rate results is large. The analysis of the accuracy rate of users completing music tasks in real experiments shows that the final accuracy rate can be improved to 100%. Based on the assignment algorithm studied in this paper, it makes full use of the accurate perception mechanism of the user to the task topic, reasonably recommends similar tasks to users with a professional background for processing, and publishes similar tasks to users with high accuracy of task answers submitted in the previous round, thus obtaining a high task completion accuracy rate, and the accuracy rate can even be close to 100% in specific cases.

In order to provide effective and timely entrepreneurial services for college students of e University, it is necessary to first analyze the needs of college students for entrepreneurial services, so as to identify the shortcomings of the current service system of e University, better conduct service positioning, and meet the needs of college students for

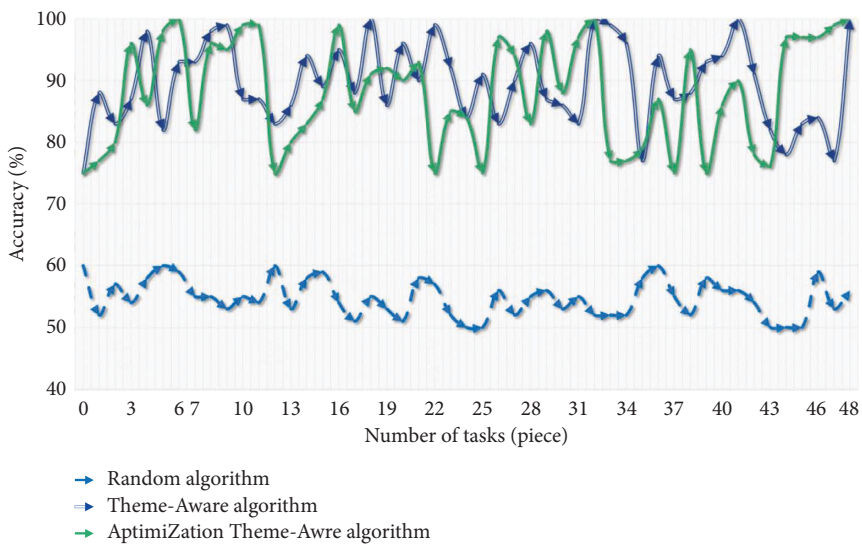

Figure 5: Accurate illustration of each algorithm handling different similar tasks.

entrepreneurial services. As for the policy incentives for college students' entrepreneurship, some investigators have chosen very strong ones. Some students think that the incentives are strong, others think that the incentives are general, and others think that the incentives are insufficient, as shown in Figure 6. This shows that the entrepreneurship service policy of the university is acceptable, but there are still shortcomings and room for improvement.

For the question of what incentive measures you hope the school can provide, the selection statistics of the investigators are shown in Table 1.

Regarding the question of how you think how to promote the effective use of scientific and technological achievements by the entrepreneurial teams of our university students, the selection statistics of the investigators are shown in Table 2.

From the above results, we can see that college students hope that the school can provide entrepreneurial teaching funds and other incentives, which is a factor in the guarantee of entrepreneurial funds. In addition, many students have chosen policy support such as credit for entrepreneurial learning and training and increased investment in software and hardware for entrepreneurial teaching and time. For the reform of the teaching management system, it is obvious that the investigators have also expressed certain needs, mainly reflected in the need to allow interdisciplinary course selection. Students hope to enhance their comprehensive knowledge through multidisciplinary and multidisciplinary learning. In the choice of how to promote the effective use of scientific and technological achievements by college students' entrepreneurial teams, more students prefer to give certain rewards to the teams that use scientific and technological achievements to start businesses. This is a more direct way. Of course, the definition of intellectual property rights is also very important, with 33.3% of the respondents choosing. Through this analysis, we find that the university can have greater development space in the service support of entrepreneurship policy to meet the needs of entrepreneurs.

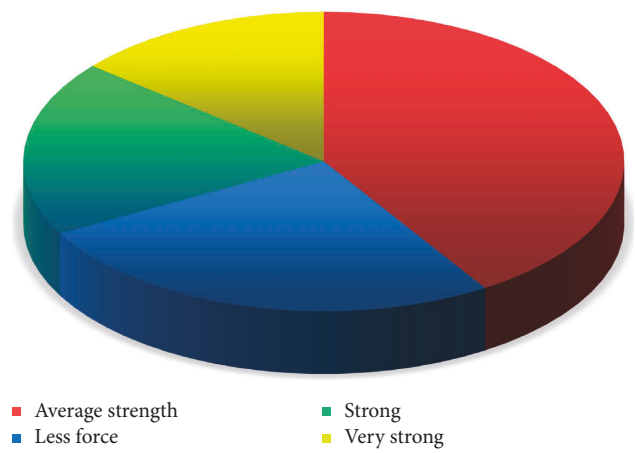

Figure 6: Survey results of entrepreneurship policy incentives of e school.

Table 1: Statistics of entrepreneurship incentive needs of college students in E.

Incentives	Percentage (%)
Entrepreneurship teaching funds (based on guarantee)	37.5
Entrepreneurship learning and training are included in credits	25.0
Increased investment in software and hardware for entrepreneurship teaching and practice	29.2
Provide basic living security and employment assistance to college students who fail to start their own businesses	8.3

For the problem of what are the shortcomings of the entrepreneurship education courses offered by the school, the selection is shown in Figure 7. Among them, the demand for teaching contents and forms is the strongest, accounting

Table 2: Demand for measures to promote the transformation of scientific and technological achievements.

Measures to promote entrepreneurship teams of college students to make effective use of scientific and technological achievements	Percentage
Give certain rewards to the teams that use scientific and technological achievements to start businesses	25%
Clear intellectual property rights	37.5&
Provide sufficient economic returns to professors who promote the transformation of scientific and technological achievements	33.3%
Other	4.2%

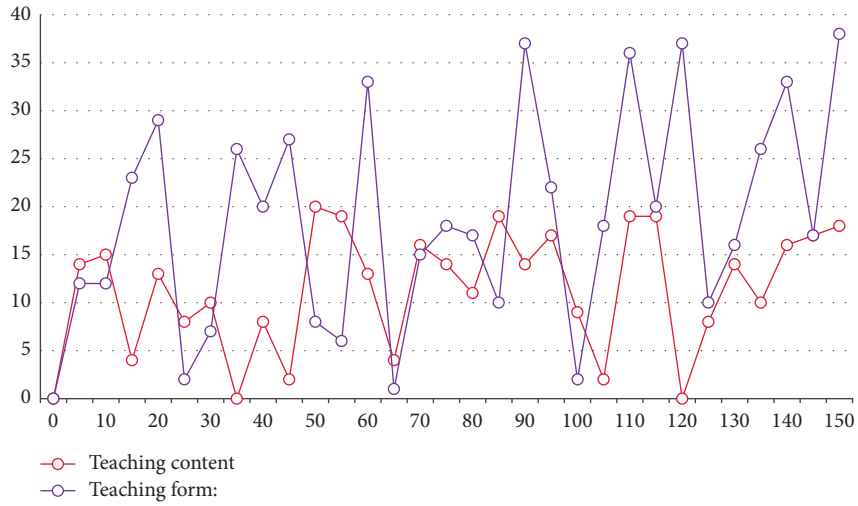

Figure 7: Demand for entrepreneurship education courses of school E.

for 37.5% and 35.4%, respectively, which indicates that students are not very satisfied with the teaching contents and forms of entrepreneurship education.

Do you have the need to participate in entrepreneurship-related training lectures or competitions? 85% of the students choose yes, and 15% of the students choose no, which indicates that the students of our school have a strong demand for entrepreneurship-related training or competitions. Although school E has carried out rich training lectures and competitions, it still needs to be strengthened and deepened.

We strengthen the contact with various departments of enterprises, be able to understand the information of enterprises and relevant industries, obtain effective recruitment information of enterprises, and provide internships and employment opportunities for students. We strengthen the contact with employment service institutions to provide professional employment guidance and obtain employment advice for students. Through contact with these social organizations, the important role of social forces in guiding and supporting the employment work of Shaanxi private colleges and universities will be brought into play, and professionals with rich experience will be employed to establish the "employment guidance Advisory Committee," which will help students understand the employment market, exchange work experience, and impart interview experience by arranging special lectures and other forms. Through the participation of social forces, the employment guidance work of Shaanxi private colleges and universities will be closely combined with the social reality and guided more effectively.

5. Conclusion

The national economy and people's means of subsistence are directly impacted by the entrepreneurship of college students. Local colleges and universities should continue to deepen the integration of educational resources within local colleges and universities and further enhance their soft and hard power while completing the reform of their own educational system and the revision of talent training programs. Big data presents both opportunities and difficulties. Effective big data processing technology may easily resolve challenging big data jobs and fully exploit the potential of resources. As a result, both businesses and academics are interested in big data processing technologies. The demands placed on the effectiveness and precision of data processing technology are increasing as society develops. As a result, it has become crucial to aggressively address the issue of training and advising college students on finding jobs. In addition to effectively employing graduates in line with the national legislation and requirements, a higher education institution has a responsibility to actively investigate, develop, and improve the entire employment guidance process. We aim to combine ongoing career counseling with staged employment training, advance the reform and development of employment work in colleges and universities, and foster the

development of all-around skills that address social demands.

Data Availability

The data used to support the findings of this study can be obtained from the corresponding author upon request.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

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