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].
estem, 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]. Mierzwia 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
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:

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

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

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

$$s(C) = \sum_{1 \leq j \neq i \leq k} d(x, \bar{x}_j).$$  \hfill (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
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

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

(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 $\alpha$ is added based on the Euclidean distance between samples:

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

(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:

\[
u = w^T x.
\] (6)

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

\[
o = f(u)
= f(w^T x).
\] (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 \( \omega_A \) for each attribute \( A \) in this paper is shown in the following formula:

\[
\omega_A = \frac{\text{Gain}(S, A)}{\sum_{i=1}^{N} \text{Gain}(S, i)}
\] (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:

\[
\Delta w_j(k + 1) = (1 - mc) \eta \delta_j x_j + mc \Delta w_j(k),
\]

\[
\Delta b_j(k + 1) = (1 - mc) \eta \delta_j + mc \Delta b_j(k).
\] (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, \( \Delta w \) is the increment of weight, \( \eta \) is the learning rate, \( \delta \) 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.
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

\[
\begin{align*}
X=10 & & W_{ij}=10 & & \text{Error} \\
X=9 & & W_{ij}=9 & & \text{Error} \\
X=8 & & W_{ij}=8 & & \text{Error} \\
X=6 & & W_{ij}=6 & & \text{Error} \\
X=5 & & W_{ij}=5 & & \text{Error} \\
X=4 & & W_{ij}=4 & & \text{Error} \\
X=3 & & W_{ij}=3 & & \text{Error} \\
X=2 & & W_{ij}=2 & & \text{Error} \\
X=1 & & W_{ij}=1 & & \text{Error}
\end{align*}
\]
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 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.
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.
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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