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Retraction

Retracted: The Application of New Educational Concepts in Digital Educational Media

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This article has been retracted by Hindawi following an investigation undertaken by the publisher [1]. This investigation has uncovered evidence of one or more of the following indicators of systematic manipulation of the publication process:

(1) Discrepancies in scope
(2) Discrepancies in the description of the research reported
(3) Discrepancies between the availability of data and the research described
(4) Inappropriate citations
(5) Incoherent, meaningless and/or irrelevant content included in the article
(6) Peer-review manipulation

The presence of these indicators undermines our confidence in the integrity of the article's content and we cannot, therefore, vouch for its reliability. Please note that this notice is intended solely to alert readers that the content of this article is unreliable. We have not investigated whether authors were aware of or involved in the systematic manipulation of the publication process.

Wiley and Hindawi regrets that the usual quality checks did not identify these issues before publication and have since put additional measures in place to safeguard research integrity.

We wish to credit our own Research Integrity and Research Publishing teams and anonymous and named external researchers and research integrity experts for contributing to this investigation.

The corresponding author, as the representative of all authors, has been given the opportunity to register their agreement or disagreement to this retraction. We have kept a record of any response received.

References

[1] C. Yang, "The Application of New Educational Concepts in Digital Educational Media," *Advances in Multimedia*, vol. 2022, Article ID 1012803, 11 pages, 2022.

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Research Article

The Application of New Educational Concepts in Digital Educational Media

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With the development and progress of society, great changes have taken place in educational concepts and teaching models compared with the past. Faced with the new educational concept of advocating diversified teaching modes and all-round talent training, the teaching space under the traditional single-fixed teaching mode is insufficient. The field of digital media education is a form of education with the development of information technology. The purpose of this paper is to find out the construction form of teaching space under the new educational concept that adapts to the development of the social era and to respond to the constantly updated and emerging educational concept and teaching mode. The process is as follows: based on the collected education data, mining the specific factors that will affect the application ability of teachers' digital education resources and building a multiple machine learning regression model using these objective and significant features to predict the score of teachers' digital education resources application ability. Through the comparison and optimization of model performance, a more suitable prediction method was found. MSE, MAE, RMSE, and MAPE are used as performance evaluation indicators to compare the performance of each model. It is found that there are multilayer linear regression < mild gradient advance < extreme gradient advance < random forest in each indicator. In addition, in the two integration models, bagging idea represented by the random forest is more suitable for this group than two gradient boosting.

1. Introduction

In the twenty-first century of comprehensive informatization and economic integration, peace and development are the main themes of the world. However, this does not mean that there is no competition between countries [1]. On the contrary, competition and cooperation between countries and regions are taking place in a new form [2]. In today's society dominated by the knowledge economy, the population structure and population quality of a country or region have become one of the most important factors that restrict or assist its development [3]. Talents will dominate the future and destiny of every country and nation as the most important human resource in the future society. It has become the consensus of the world [4]. The most important indicator to measure the comprehensive national strength of a country or region is the level of scientific and technological development [5]. The development of science and technology is inseparable from the reserve of human resources [6]. The most important and effective way to cultivate human resources and maximize the development of sleeping human resources is education [7]. Therefore, all countries and regions in the world attach great importance to the development of domestic education [8]. Although the level of development varies from country to country, they all take education to an extremely important level and give priority to development [9]. Entering the new century, the international environment and the background of the era have become increasingly complex and diverse, and the opportunities and challenges facing the country are even more severe [10]. The importance of education and talent training has become more prominent [11]. *The outline of the national medium - and long-term education reform and development plan* points out that "information technology has a revolutionary impact on education development and must be attached great importance to. By 2020, we will

basically build a digital education service system covering all types of schools at all levels in urban and rural areas and promote the modernization of education content and teaching means and methods." It is obvious that digital teaching has become the inevitable trend of current school education development.

At the beginning of the century, several major powers in the world have formulated new talent training strategies to adapt to the future development and promulgated a series of education laws [12]. On January 8, 2002, President Bush of the United States signed the "Leave No Child Left Behind" education reform bill and at the same time increased the budget for primary and secondary education; the Australian Federal Department of Education also signed the "About 21st Century National Schools" on future education reform and the Adelaide Declaration of Educational Goals; At the same time, the two major East Asian countries face each other across the sea. South Korea has formulated the "21st Century Reform Plan" and implemented a series of reform plans for different education stages. The Ministry of Education, Culture, Sports, Science and Technology of Japan has promulgated the Japanese 21st Century Education Freshmen Plan [13]. From the new education policies introduced by these countries, it is evident that primary and secondary education, as the basic stage of lifelong education for people, has received more and more attention from all aspects [14]. Instead of training according to the needs of industrialized mass production in the last century, it is more inclined to cultivate comprehensive talents in line with the information society [15]. With the emergence of various new educational concepts and the popularization of more advanced teaching equipment, the teaching methods and curriculum content in countries around the world have also changed accordingly [16]. Comprehensively, while paying attention to fair cultivation, it also emphasizes guiding and cultivating citizens' ideological and moral character [17]. The criteria for judging students are also more diverse and objective, and instead of blindly referring to test scores, the evaluation system is more abundant, the importance of test scores is reduced, and more emphasis is placed on students' additional abilities beyond their scores [18]. In today's world, science and technology are advancing with each passing day. Modern information technologies such as the Internet, cloud computing, and big data are profoundly changing the way people think, produce, live, and learn. The main task for educators is to respond to the development of information technology, promote educational reform and innovation, build a networked, digital, personalize a lifelong education system, build a learning society where everyone can learn at any place and any time, and cultivate a large number of innovative talents.

The characteristics of the communication structure of the "micro era" have become the most important communication method in the information society [19]. The emergence of new media has a direct impact on the teaching mode, learning methods, and teaching methods, as well as the feelings and experiences of practical links in the education classroom from the perspective of concepts and methods [20]. Therefore, great changes have taken place and will continue to improve and innovate with the technical requirements of the new era. The rapid development of media technology has accelerated the trend of media integration, and traditional media is rapidly transforming into digital media. Entering a new era, virtual reality technology and artificial intelligence have begun to promote a new round of technological revolution [21]. Under the new situation, higher education needs to cultivate compound innovative talents who meet the diverse needs of society. Since its establishment in 2006, the Department of Digital Media Technology of Central China Normal University has carried out three reforms and innovations around talent training and teaching models to meet the new demands of the times for digital media talents. In the theory of "teaching and learning", Ausubel, an American constructivist educator, put forward the teaching mode of "taking skill training as the core, establishing project oriented, and task driven" [22]. However, current research shows that there are generally obvious differences in the application level of teachers' digital educational resources. Due to the lack of teachers' own application ability, the use of existing infrastructure and high-quality digital resources to develop educational and teaching activities has not achieved good results [23]. Therefore, it is necessary to understand the current level of teachers' informatization application, especially the relevant influencing factors of their ability to apply digital educational resources, and to explore how to predict the application status of teachers in the region, so as to provide interventions to improve the professional development of teachers' digital resources and solve the application of interregional resources [24]. Differences need to be considered. Therefore, based on machine learning, this paper mainly analyzes new educational concepts and the ability of teachers to apply digital educational resources in digital educational media.

Existing studies have shown that teachers will encounter two types of resistance in integrating information technology into teaching, namely, external resistance and internal resistance. In the context of using information technology to support teaching, external resistance is the external factor affecting teachers' behavior, such as Internet access, preparation of information technology equipment, bandwidth, technology-related training, and other external environmental factors. When the external resistance is removed, teachers will not consciously integrate information technology into teaching to improve the effect of meaningful teaching. This is because factors related to teachers' teaching ideas and knowledge status, such as teachers' attitude towards using information technology, self-efficacy, intention, and other internal resistance, will become the second obstacle affecting teachers' teaching behavior, and these obstacles are called internal resistance.

2. Materials and Methods

2.1. Development of New Educational Concepts in China. The so-called digital media education refers to the use of multimedia and network technology to digitize the main information resources of schools and to achieve digital information management and communication, so as to form

a highly information-based talent training environment. Chinese modern education started in the early 20th century. After more than 100 years of development, it has cultivated a large number of talents for social development and national construction. However, due to the special and complex national conditions and historical and social reasons in China since modern times, even though some areas have made attempts to reform and innovate education, the current primary and secondary education model is still relatively traditional exam-oriented education, and the education level is relatively backward. This leads to some common problems in the stage of compulsory education. For example, the main body of teaching behavior is still teachers, and most of them are the previous teaching mode of cramming, which often ignores the cultivation of students' self-thinking and self-innovation ability. Teaching evaluation is still based on students' test scores, and the evaluation of students is also based on test scores. Therefore, the traditional teaching mode and concept seriously restrict the development of education in our country, and students' collaboration ability, innovation ability, learning ability, and moral quality cannot be developed as they should.

In the 21st century of comprehensive informationization, society has a new understanding of the definition of talents, and the demand for talents is higher and higher. Traditional single-type talents are no longer suitable for the development of today's society. Quality education aims to impart knowledge to students, cultivate their comprehensive abilities such as self-learning cognition and practical innovation, and attaches great importance to students' all-round development. Based on the concept of quality education, combined with some advanced international education models and experiences, scholars in China have also conducted a series of research and exploration. So far, various new educational concepts have emerged in schools across the country. Modernized and open teaching methods and teaching spaces have also appeared one after another. Most of the teaching behavior advocated by the new educational concept is the communication and interaction between teachers and students, abandoning the previous one-way knowledge transfer. In the process of teaching behavior, the two sides of interaction are not limited to the interaction between teachers and students, and the interaction between students and students is equally important. At the same time, the teaching methods are also more diverse, and more attention is paid to the unique psychological states of different groups of students at different stages.

2.2. Necessity of Innovation in Digital Media Education in the New Era. With the rapid development of China's economy and technology, the public's demand for culture is increasing day by day. Under the national "Internet +" strategy, the in-depth integration of information technology into various fields has brought opportunities for the development of cultural and creative industries and also put forward new requirements for the reform and innovation of digital media education in China.

(1) The development of the industry is the inherent demand for the innovation of media talent training. For the prosperity and development of cultural and creative industries, creativity is the core competitiveness. In the era of "content is king," whether it is traditional media such as movies and TV, or emerging new audio-visual media such as live broadcast and online short video, their operation mainly relies on high-quality content and platforms. The high-quality content that stands out from the competition comes from the rich creativity of media people. The talent training mode of colleges and universities should focus on the national innovation and development strategy and cultivate the innovation consciousness of contemporary college students. In the digital media technology major of the author's school, in addition to imparting students' professional knowledge and skills, teaching should further cultivate and forge students' innovative ability. In the new educational environment, colleges and universities urgently need to explore how to integrate curriculum resources to build a talent training model with innovative spirit and ability to adapt to the needs of the times and focus on openness, sharing, and digital in-depth integration.

(2) The ability training of colleges and universities drives the transformation of course teaching methods. The main content of the *Stanford University 2025 Plan* covers four aspects, namely, "open-loop university," "flipping around the axis," "adaptive education," and "purposeful learning." Focusing on the reform of the academic system, the transfer of teaching focus, the reconstruction of the curriculum system, and the reform of learning methods, it puts forward a bold reform concept, emphasizes the dominant position of students, implements personalized education and independent education, integrates multidisciplinary resources, and cultivates awareness and ability to solve global problems. Students majoring in digital media technology at Central China Normal University have formed a teamwork working method in the school stage by completing work in the course study, exercised the ability of collaborative learning and problem-solving, and accumulated industry experience in advance. In addition, all-round interaction with teachers in class and after class through project practice effectively promotes students' internalization of knowledge and improves their ability to solve problems in the process of practice.

2.3. Research on the Current Situation of Machine Learning in the Field of Education and Teaching. The research purpose of machine learning is to use computers to simulate human learning activities. It is a method for computers to recognize existing knowledge, acquire new knowledge, constantly improve performance, and achieve self-perfection. There are three research objectives of machine learning: the cognitive

model of the human learning process, the general learning algorithm, and the method of constructing a task-oriented special learning system. With the explosion of educational data, how to use a large amount of educational and teaching data for analysis to achieve accurate prediction and decision support is a new direction for thinking in the era of artificial intelligence. As an important method in the field of artificial intelligence, machine learning can meet the needs of educational big data analysis and prediction. In recent years, machine learning education application cases and related research based on real data have been continuously carried out at home and abroad, and they are committed to introducing machine learning technology into education and teaching activities. At the policy level, in May and October 2016, the National Security and Technology Council of the United States released two reports, "Preparing for the Future of Artificial Intelligence" and "National Artificial Intelligence Research and Development Strategic Plan," respectively, pointing out that the realization and promotion of AI research are necessary. The core technology is machine learning. The Chinese government also attaches great importance to the development of artificial intelligence technologies such as machine learning. In April 2018, the Ministry of Education issued the "Education Informatization 2.0 Action Plan," which was proposed to "rely on emerging technologies such as artificial intelligence to promote the reform of education models supported by new technologies." In the field of practical research, many foreign scholars have begun to explore machine learning in the field of education earlier and have made certain progress. Although domestic researchers have begun to use machine learning technology to generate value in the field of education research relatively late but also achieved varying degrees of success. There are also practical applications of machine learning for the group of teachers in this study and the forecasting techniques to be implemented.

3. Results and Discussion

3.1. Common Regression Algorithms. Regression is the prediction of new data based on existing data. Linear regression can accurately describe the relationship between data with a straight line so that when new data appear, a simple value can be predicted. The linear regression model is very easy to understand, and the results are very interpretable, which is conducive to decision analysis. Multilayer linear regression is to study the regression problem between a dependent variable and multiple independent variables, and it is also a statistical method to determine the relationship between independent variables and dependent variables and give explanations. In regression analysis, when there is only one independent variable and one dependent variable, the independent variable will be used as the main factor to explain the change in the dependent variable, and a straight line can be used to approximate the relationship between the two. Such a regression analysis is called univariate linear regression, and its formula is as follows:

$$y = \alpha + \beta x + \varepsilon, \tag{1}$$

where α and β are the regression coefficients and ε is the random error term. When there is a linear relationship between multiple independent variables and dependent variables, this regression analysis is a multilayer linear regression analysis, so the multilayer linear regression model is optimized on the basis of the univariate regression model, and its formula is as follows:

$$y = \alpha + \beta_1 x_1 + \beta_2 x_2 \ldots\ldots + \beta_n x_n + \varepsilon. \tag{2}$$

Among them, n represents the number of explanatory variables, α and β ($i = 1, 2, \ldots\ldots, n$) are partial regression coefficients, and ε is a random error term.

Extreme gradient boosting, also known as XGBoost, is one of the boosting algorithms in the inheritance algorithm, and it is an improved algorithm based on GBDT. The objective function of the algorithm is as follows:

$$L(\varnothing) = \sum_i l(y_i, \hat{y}_l) + \sum_k \Omega(f_k). \tag{3}$$

$$\Omega(f) = \gamma T + \frac{\lambda \|w\|^2}{2}. \tag{4}$$

Among them, $L(\Phi)$ is the loss function, usually a convex function, which measures the difference between the predicted value y_i and the actual value y_i. The second-order Taylor expansion of the loss function is obtained as follows:

$$\begin{aligned} L^{(t)} &= \sum_{i=1}^{n} l\left(y_i, \hat{y}_l^{(t-1)} + f_t(x_i)\right) + \Omega(f_t), \\ &\sum_{j=1}^{T}\left[g f_t(x_i) + \frac{1}{2} h f_t(x_i)\right] + \gamma T + \frac{1}{2}\lambda \sum_{j=1}^{T} w_j^2. \end{aligned} \tag{5}$$

In the formula, g_i is the first derivative and h_i is the second derivative.

The formula is expressed as follows:

$$I_j = \{i | q(x_i) = j\}. \tag{6}$$

If the sample set on the leaf node is j, then the following formula is obtained:

$$L^{(t)} = \left[\left(\sum_{i \in I_j} g_i\right) w_j + \frac{1}{2}\left(\sum_{i \in I_j} h_i + \lambda\right) w_j^2\right] + \gamma T. \tag{7}$$

When the tree structure q is known and the leaf node weight $w_j$of the formula has a closed-form solution, the objective function is as follows:

$$\begin{aligned} w^* &= -\frac{\sum_{i \in I_j} g_i}{\sum_{i \in I_j} h_i + \lambda}, \\ L^{(t)}(q) &= \frac{1}{2} \sum_{j=1}^{T} \frac{\left(\sum_{i \in I_j} g_i\right)^2}{\sum_{i \in I_j} h_i + \lambda} + \gamma T. \end{aligned} \tag{8}$$

The advantage of XGBoost is that on the one hand, it supports linear classification and regression, which can speed up the training speed and provide a fast lane for model training. On the other hand, XGBoost sets the learning rate for leaf nodes when creating trees and reduces the cost of each tree. The weights that reduce the influence of each tree on the model provide a better learning space. However, XGBoost still needs to traverse the data set in the process of node splitting. In the presorting process, not only feature values but also features are stored. There are many samples corresponding to the gradient statistics of the index, so the memory consumption is relatively large.

Model fusion, as the name suggests, is to fuse multiple models together, also known as ensemble learning. In the process of solving real problems, each algorithm model has its own advantages, but it also has certain limitations. If multiple algorithms are fused together, a learner with better performance than a single model can be produced, which can not only inherit the advantages of different algorithms but also avoid some shortcomings of a single model. Therefore, in the field of machine learning, the practice of model fusion is very common. Common model fusion strategies include the voting method, the average fusion method, and the learning method, and ensemble learning methods include bagging, boosting, and stacking.

The simple average method refers to the direct summation of the prediction results of all multiple regression models, and then, the average value is calculated. The fusion expression is as follows:

$$Y(x) = \frac{1}{n}\sum_{i-1}^{n} \hat{y}_i(x). \tag{9}$$

The weighted average is to give different weights to different models through some methods and then combine the weights with the results of the base learner and then calculate the average. The fusion expression is as follows:

$$Y(x) = \sum_{i-1}^{n} w_i(x)\hat{y}_i(x). \tag{10}$$

There are various methods, which need to be selected according to actual needs. Because the effects of the three models that need to be fused this time are close, it is not suitable to choose the most basic "voting method" for fusion. It is more suitable to use the weighted average. Although the results are similar, there are always differences.

Random forest performs sampling according to a random method, which can establish a decision forest that meets needs, and there are multiple decision trees in this forest. A decision tree is a basic classifier, which generally divides features into two categories (decision tree can also be used for regression). The constructed decision tree has a tree structure and can be considered as a collection of if then rules. The main advantage is that the model is readable and that the classification speed is fast. Therefore, the random forest is an integrated classification algorithm composed of several decision trees. Its basis is the decision tree algorithm, and its core is how to use the idea of randomization to construct multiple decision trees of the random forest. In the ensemble algorithm, the algorithm idea of the random forest is not complicated, and it is a more common method in dealing with binary classification, multiclassification, and regression tasks. Because each decision tree is operated independently in parallel, it can save time and computational overhead, which is called "representative method of ensemble learning technology level." Of course, random forests also have shortcomings. Random forests do not continuously output results, and if the data exceed the range of the training set, they become unpredictable, so this sometimes leads to overfitting, but no further research was conducted in this paper on the problem of overfitting.

3.2. Model Setting of Teachers' Digital Educational Resource Application Ability. In this study, the effects from teachers (Tier 1) are not considered to be completely independent due to the nested nature of the data; i.e., teachers from schools (Tier 2) share the school environment, and a two-tier linear model is used as the basic analysis tool. The first layer of equations contains teacher-level predictors, and the second layer contains school-level predictors. If a multilevel linear model is used to conduct cross-level analysis on research objects with multilevel and nested data structures, individual effects and external environmental effects can be separated, and then, the influence of variables at the two levels can be explored separately. Therefore, this paper will construct five models and use the multilayer linear regression model to explore the influence of the school level and the teacher level on the ability of teachers to apply digital resources. Figure 1 shows the hypothetical model of the factors influencing the application of digital educational resources for teachers.

The zero model is as follows:

$$\begin{aligned} Y_{ij} &= \beta_{0j} + r_{ij}, \\ \beta_{0j} &= \gamma_{00} + \mu_{0j}. \end{aligned} \tag{11}$$

Y_{ij} represents the digital resource application ability of the teacher i in the school j, β_{0j} represents the average value of the digital resource application ability of teachers in the j school, which is a random error at the teacher level, Y_{ij} represents the overall average value of teachers' digital resource application ability, μoj is the difference between the school j, and the overall the difference between the averages is a random error at the school level.

The influence (slope) of each predictor in Model 1 and Model 2 on teachers' ability to apply digital educational resources remains constant among schools, and both belong to the random-effect covariance model:

$$\begin{aligned} Y_{ij} &= \beta_{0j} + \beta_{1j}X_1 + \beta_{2j}X_2 + \cdots + \beta_{10j}X_{10} + r_{ij}, \\ \beta_{cj} &= \gamma_{c0} + \mu_{cj}, \quad (c = 0, 1, 2, 3 \ldots 10), \end{aligned} \tag{12}$$

where β_{1j}. β_{10j} are the partial regression coefficients of the influence of the predictors X_1, X_2...X_{10} on Y_j, respectively. On the basis of Model 2, the background of the school's geographical location and the number of in-service teachers

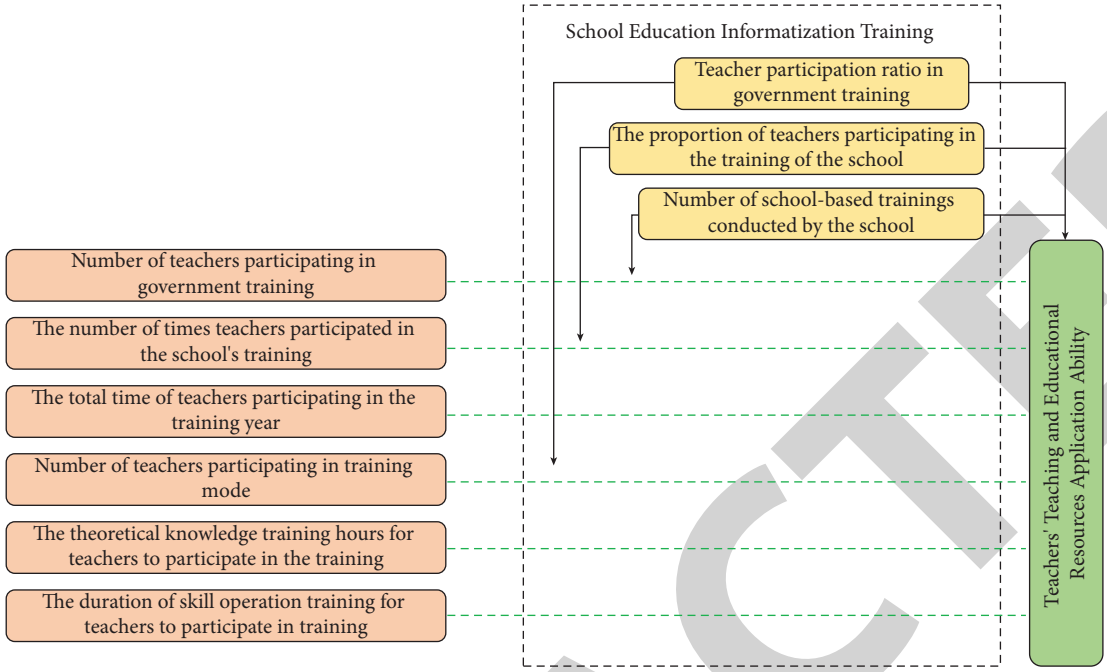

Figure 1: Hypothetical model of factors influencing the application of digital educational resources for teachers.

(Model 3) are included in the second-level equation as predictors. The school informatization training variable of the proportion of teachers in school-based training is used as a predictive model (Model 4) to examine the impact of school-level factors on teachers' ability to apply digital resources. Both Model 3 and Model 4 belong to the non-random variation intercept model.

4. Result Analysis and Discussion

4.1. Data Acquisition and Preprocessing. The experimental data in this study come from two types of questionnaires, the "Questionnaire on the Development of Informatization of Primary and Secondary School Teachers" and the "Questionnaire on the Development of Informatization in Primary and Secondary Schools" in the National Informatization Research Action. In the determination of schools, a total of 1,579 questionnaires from primary and secondary schools in the province were selected, and more than 20,000 pieces of information were used as the data set for this study. Using this series of questionnaires, the following four parts of useful information can be collected: the first part is the background information of teachers and their schools, including gender, education, teaching years, and the number of teachers in the school; the second part is the ability of teachers to apply digital resources, such as the frequency of teachers' use of informatization in each link; the third part is the training participation of teachers, such as the number of training participation, duration, and number of models; the fourth part is the school's development of training, such as school development, the number of school-based training, and the proportion of teachers participating in school-based training.

During the implementation of data mining technology, both algorithms and targets have higher requirements for data, and if the original data are mixed, it is difficult to meet the experimental requirements. Usually, the obtained educational data are based on the evaluation objectives and evaluation objects. Different scenarios and different dimensions of data are selected. Therefore, it may occur that the data collected initially cannot be directly used for mining. Therefore, the data must be processed and cleaned to a certain extent. Unify the data form, reduce noise, and integrate high-quality data to reduce mining costs, improve operational efficiency, and obtain good experimental results. The specific data preprocessing process is shown in Figure 2.

The data cleaning routine "cleans" the data by filling in missing values, smoothing noise data, identifying or deleting outliers, and resolving inconsistencies. It mainly achieves the following objectives: format standardization, abnormal data elimination, error correction, and duplicate data elimination. Data integration refers to the centralized integration of multiple required data sources to form a complete data set, reducing data clutter and storage inconsistency, thereby improving the efficiency of data analysis and mining. In this study, the data of the experiment were provided by two types of questionnaires: teachers and schools. Each teacher filled in the name of the school where he was employed, and each school also filled in its own detailed name. The teacher's personal information, training situation, and informatization application situation are matched with the background and training situation of the school where they work, so as to realize the integration of data. In order to ensure the high quality of the sample data and the high accuracy of the mining analysis results, the sample data that the teachers failed to successfully correspond to the school should be eliminated.

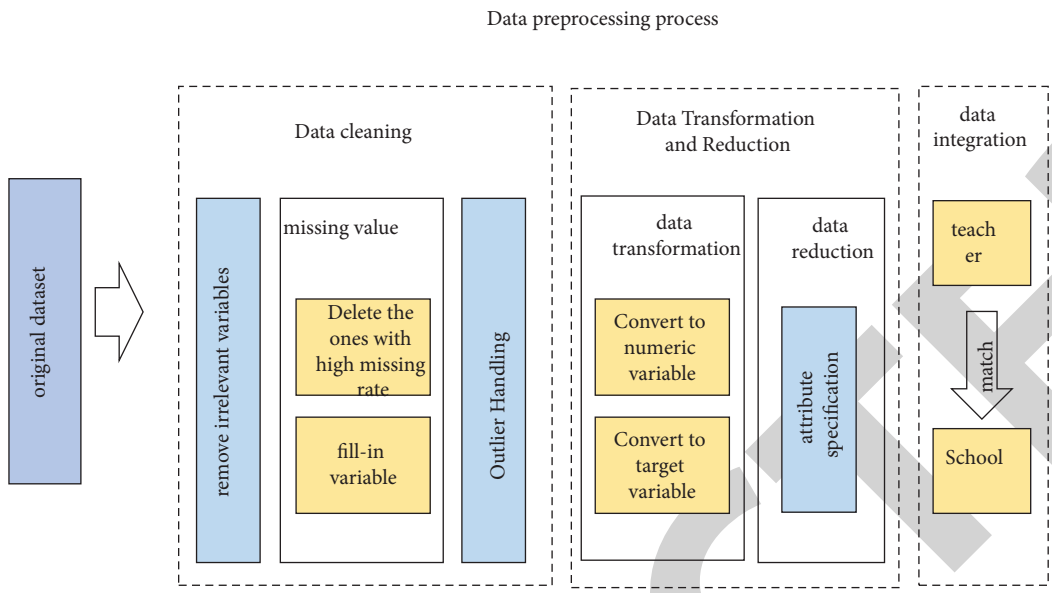

Figure 2: Data preprocessing process.

Figure 3: Multilayer linear regression test set fitting results.

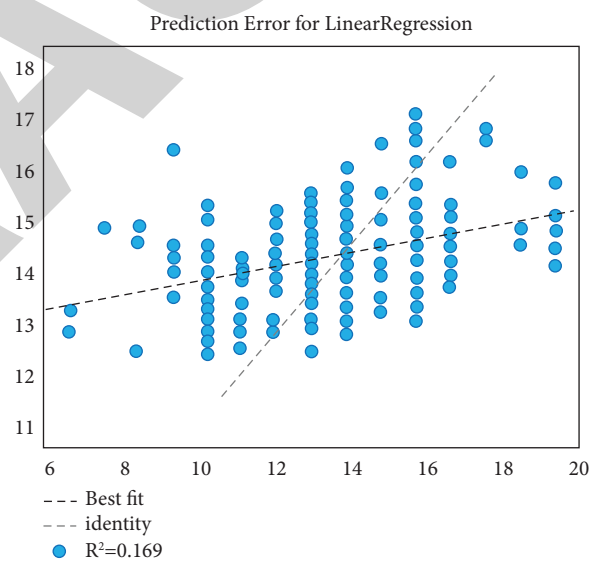

Figure 4: Regression curve of the multilayer linear regression model.

4.2. Experimental Results and Analysis. After solving the parametric equation and bringing it into the test set, the performance is shown in Figure 3. The prediction results are mainly in the range of 12 to 16, while the parts below 12 and above 16 are not fitted at all. This is also in line with the characteristics of the linear model, and after all, the geometric meaning of its objective function is a straight line.

The multilayer linear regression model has the advantage of using multilayer linear regression; that is, it does not waste samples and can study individual differences while ensuring that error independence assumption is not violated. The shortcomings of multilayer linear regression are also the shortcomings of most single models of machine learning. The learning ability of the model is far less than that of ensemble learning, and its prediction performance is relatively weak. Figures 4 and 5 show the evaluation indicators of the multilayer linear regression model. It can be seen that the overall value is not high, but the MAPE is more than 15%. It shows that the prediction effect of this model is quite different from the best fit.

If a separate ensemble model is also regarded as a single model, there are often problems such as insufficient data utilization and low prediction accuracy, and in general, the performance of the fusion model is better than that of the single model. Therefore, the author continues to propose two model fusion methods based on low-error machine learning for teachers' digital education resource application ability prediction, so as to improve the effect of ability

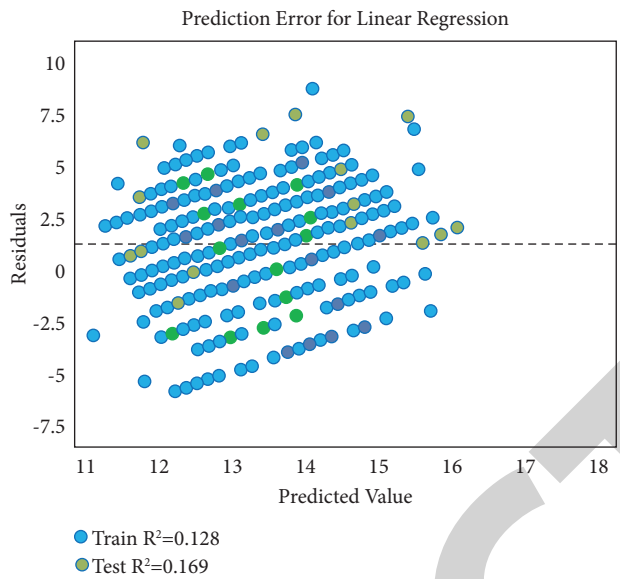

Figure 5: Residual distribution diagram.

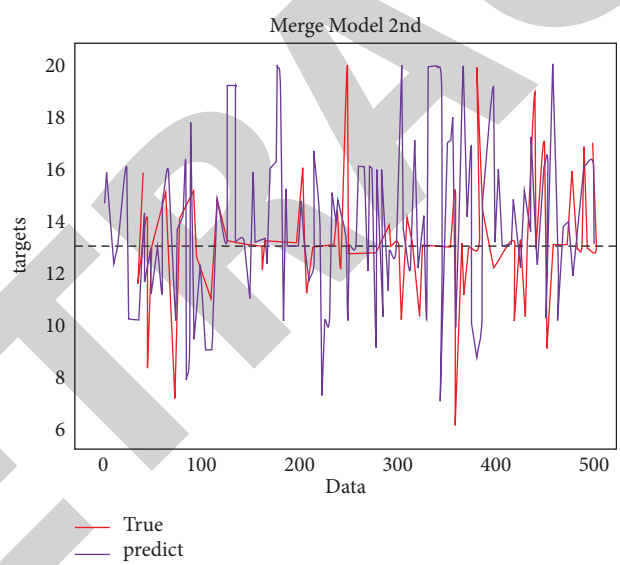

Figure 6: Comparison of the multilayer combination test set of the random forest.

prediction. The prediction and fitting effect of the model on the test set is shown in Figure 6. It can be seen that except for minor differences, the prediction results of the model are relatively good. In terms of the MAPE index, the multilayer combination model based on the random forest has the best performance, so it verifies the correctness of the fusion idea. Since the MAPE indicator represents that it is closer in the comparison between the model-predicted value and the actual value and that its residual distribution is also the smallest, in general, the multilayer combination model based on the random forest is the best choice for the prediction scheme.

Since it is a case display and analysis of the application of the predicted value of teachers' digital educational resource application ability, this paper will select two training indicators as representatives to analyze the feasibility of accurately identifying the training needs of low-level teachers in the indicators. The obtained analysis results provide the basis for education management departments and schools in the design of training programs, the size of personnel, and the determination of lists. In order to make the recognition effect more intuitive, this paper visually displays the training participation of 185 middle- and low-level teachers in district A in the form of scatter plots. The specific results are shown in Figure 7.

According to Figure 8, it can be seen that teachers are also more active in participating in informatization training. The number of government training participation and the

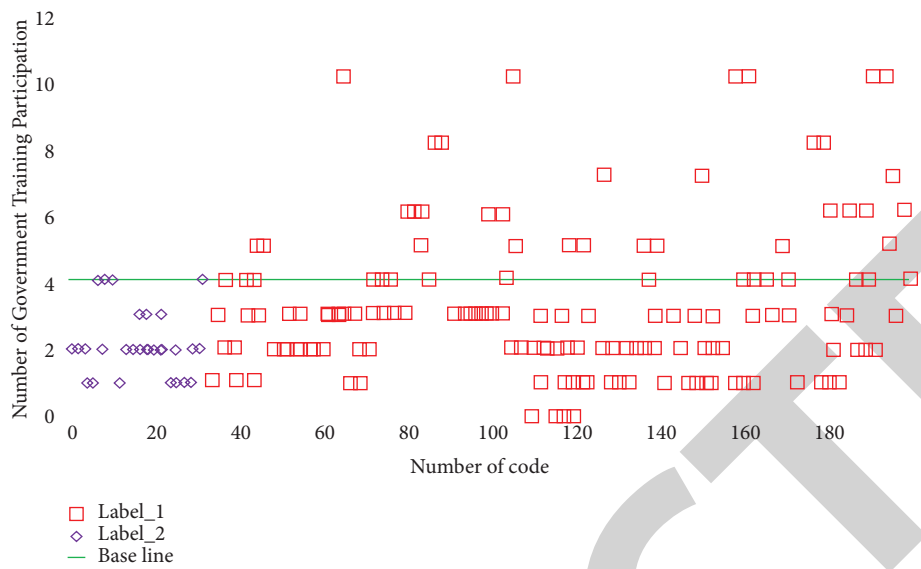

Figure 7: Predicted number of government training participation of low- and medium-level teachers by region.

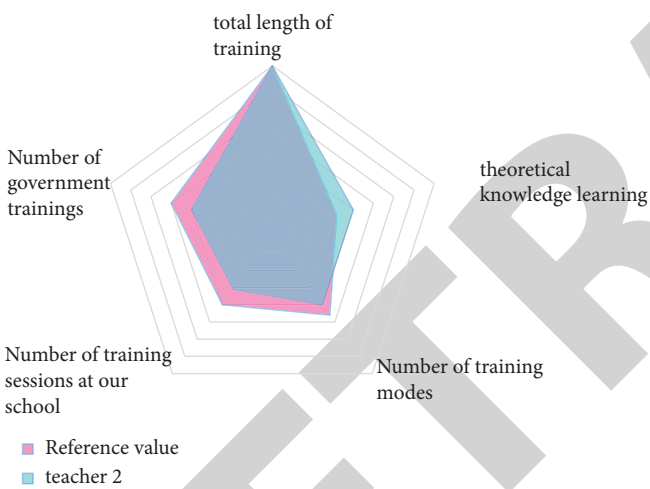

Figure 8: Teachers' participation in the dimension of informatization training.

hours of theoretical knowledge are both above the average level. Although there is a slight deficiency in the number of school-based training, the total annual time, and the number of models, the gap is small. If these aspects can be improved, the application of digital education resources for teachers will be greatly improved. Capabilities may be further enhanced.

Therefore, in order to improve the application of digital education resources and expand the coverage of digital education resources, the connotation construction of digital education resources should be improved first. Second, we should create a campus cultural environment that supports teachers to integrate and use digital education resources. Finally, it is necessary to carry out the ability training for teachers to integrate digital education resources and provide teachers with a sense of self-efficacy in the use of digital education resources.

5. Conclusion

Since modern times, China's educational philosophy has been deeply influenced by Western countries. In the early days of the founding of the People's Republic of China, the teaching form of the "class teaching system" of the former Soviet Union was basically followed. On the basis of copying the former Soviet Union, the educational concept and teaching mode have made certain changes and adjustments according to China's national conditions. At the same time, influenced by the traditional "employment examination system", it developed into "examination-oriented education" with Chinese characteristics in the later stage. In the traditional education concept and teaching mode, teachers are the main body of teaching activities in teaching, mainly one-way collective teaching of teachers to students. The method in the teaching process is not innovative, and the teaching content only focuses on students' cultural knowledge. To a great extent, the purpose of teaching is to ensure the entrance examination in the next stage. The new educational concept advocates the all-round development of education, pays attention to the development of students' potential, and respects the subjective initiative of the individual. Under the influence of this educational concept, a large number of new teaching modes have emerged. The common point of these teaching modes is that the main body of teaching activities has changed from traditional teachers to students; information has changed from one-way transmission between teachers and students to multidirectional communication between teachers and students. Among them, teachers' ability to apply teaching resources becomes very important. Based on the collected educational data, this paper mines the specific factors that will affect the ability of teachers to apply digital educational resources and uses these objective salient features to construct multiple machine learning regression models to predict the application ability score of teachers' digital educational resources.

Through the comparison and optimization of the model's performance, a more suitable prediction method for the research group was found. Using MSE, MAE, RMSE, and MAPE as performance evaluation indicators to compare the performance of each model, it is found that in each indicator, there is a multilayer linear regression < mild gradient boosting < extreme gradient boosting < random forest. In addition, in the two integrated models, the bagging idea represented by the random forest is more suitable for this group than two gradient boosting.

Data Availability

The figures and data used to support the findings of this study are included in the article.

Conflicts of Interest

The author declares that there are no conflicts of interest.

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