

Retraction

Retracted: A Study of English Informative Teaching Strategies Based on Deep Learning

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This article has been retracted by Hindawi following an investigation undertaken by the publisher [1].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) Manipulated or compromised peer review

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] Y. Guo, "A Study of English Informative Teaching Strategies Based on Deep Learning," *Journal of Mathematics*, vol. 2021, Article ID 5364892, 8 pages, 2021.

Research Article

A Study of English Informative Teaching Strategies Based on Deep Learning

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The rapid development of artificial intelligence brings new development opportunities and challenges to English teaching university. This paper explores the concept of “smart education” and the path of building an ecological information-based teaching model of English college by interpreting the concepts of artificial intelligence, deep learning, ecological linguistics, and language education. Artificial intelligence, especially deep learning, will be promising in many aspects, such as the analysis of individual differences of language learners, customized learning content, diversified and three-dimensional teaching media, the role of teachers as smart classroom designers, and multidimensional and dynamic formative assessments. By relying on the data mining technology of deep learning to analyze learners’ characteristics, the smart classroom design, the promotion of language learners’ independent learning, and the establishment of dynamic and complete learner profiles, the language learning process is no longer a linear process but an evolving open loop, ultimately forming a harmonious development of various ecological niches in the language learning process. In this paper, we study and design a deep learning-based English informatics teaching system to develop a deep learning-based scoring prediction model. The model incorporates deep learning models based on word embedding and text convolutional networks, which can uncover the hidden interest features of academics for English. The experimental research results prove that the online e-learning service platform cannot only effectively meet the diverse and personalized English learning needs of university students, but also improve the learning efficiency of teachers and students.

1. Introduction

The application of deep learning techniques can show a unique advantage in the field of English learning and play an important supporting role in students’ learning and teachers’ teaching. Its role in promoting the reform of English language teaching is explored in terms of writing, translation, listening, and speaking. Concerning the writing, [1] includes deep learning for teaching English professional writing, where the application is mainly about English composition content criticism. The automatic correction system on the deep learning platform can analyze students’ English compositions very comprehensively, make basic judgments on the structure of students’ essays, make timely corrections to spelling errors and grammatical errors in students’ essays, and propose timely corrections. Teachers can also use the system’s automatic feedback mechanism to manually correct students’ essays for a second time and

provide further feedback to students. At the same time, the teacher can also grasp the students’ learning situation according to the assessment report given by the system and implement reasonable curriculum improvement, which is important for the improvement of teaching methods and upgrading of the teaching system [2]. For the role explored in the form of translation, we mention deep learning for teaching English professional translators, which made significant achievements and breakthroughs in the field of English translation and has achieved certain pedagogical results in teaching English translation. First, the use of deep learning-assisted translation systems for English translation can significantly optimize the basic process of English translation. This is especially important for students to be able to translate English proficiently in the future and to apply their learning. Secondly, the English translation software and platform based on cloud services can help students solve many difficult translation points, which can

enhance students' confidence to a certain extent and stimulate their interest in learning English at a deeper level. Finally, the translation tasks set by the intelligent cloud platform can use artificial intelligence to track each student's translation and form evaluation reports, which can grasp the students' translation characteristics and problems in a timely and accurate manner and realize personalized teaching guidance and improvement of teaching courses. In in-depth study of college English listening instruction, listening training is of great importance to the development of students' English literacy [3]. However, many students are resistant to listening to English due to the boring content of listening materials and the difficulty of listening. The deep learning language platform can provide students with a large amount of listening materials with a wide variety of difficulty and topics to meet the different needs of different students for English listening. In such an environment, not only can students choose the corresponding English learning materials according to their interests for in-depth learning, but also deep learning can automatically match students with suitable listening materials and learning contents through the analysis of their basic information. Finally, the assessment of spoken English for majors is an important aspect. The purpose of learning a language is to achieve better communication and exchange. Therefore, in the actual teaching process, it is necessary to strengthen students' learning as well as mastery of spoken English to help them improve their English speaking skills [4]. Deep learning has a great advantage in teaching English as a foreign language, as the English communication environment becomes more colorful because of educational robots, and real-time conversations help students to use English. Educational robots can be accompanied by students and interact with them to create a continuous and natural environment for using English, and this process can help students to improve their English speaking skills by relieving their nervousness when talking with real people.

2. Related Works

In this section, strategies for learning languages are discussed; some used techniques, processes, and evaluations.

2.1. English Informatics Teaching Strategies. With the deepening of AI in multiple perspectives of teaching such as English teaching assessment, teaching platform optimization, and teaching tutoring, it has brought new creativity to the teaching space for students and teachers, greatly improving teaching efficiency and optimizing students' learning experience at the same time [5]. Firstly, in the preclass preparation stage, the introduction of AI teaching platform brings teachers a natural free resource bank, and at the same time, teachers can share lesson plans at any time and any place across time and space intervals to achieve the optimal use of resources. Finally, in the after-school evaluation stage, the AI teaching end does not need to worry about face, whether it is the teacher to students or students to the teacher's summary evaluation. Evaluation should be

more fair and just, and it is also more conducive to both parties to discover and correct problems in a timely manner [6]. Personalized education is more inclined to export more innovative and personalized talents to the society than the traditional education of "uniform production," which contradicts the limited energy of teachers. The personalization of education requires teachers to develop targeted development strategies by understanding students' psychological characteristics and interests. This conflict is also solved by the large database of the AI-enabled education system [7]. The database will make judgments based on the students' own set learning preferences, learning abilities, and the actual learning status of the students and make a series of learning plans according to the different situations of each student. Based on this, the database will also collect the learning dynamics of each student and adjust the curriculum according to their learning dynamics so as to truly tailor the teaching to the student's needs and achieve personalized development [8]. Regarding the nonstandardized examination and evaluation system before the introduction of artificial intelligence system into the teaching evaluation, the daily test questions were given by one or more teachers, but such a way of giving questions has a great human factor. On the one hand, the teachers do not fully grasp the difficulty level of the test questions, and there is lack of standardization; on the other hand, because different teachers have different teaching styles and teach students with different emphasis on knowledge points, it is difficult to take into account. On the other hand, it is difficult to take into account the learning progress of all students because different teachers have different teaching styles and teach students with different emphasis. After the introduction of the intelligent system, the test questions are combined by the system database, basically based on the requirements of the syllabus, and the test methods are diversified so that the test questions can be intelligently composed according to the online learning records of different students, and the students can be monitored purposefully so that the students can find out what they have not yet mastered in the process of the test, which is more conducive to checking the gaps and playing the evaluation role of the test. In addition, the AI system can mark the papers by itself after the students finish the exams, reducing the teachers' workload. Data-driven effective promotion of teaching work quantification behind the AI teaching end is based on a rich database of data resources, providing information to teaching while also designing programs that play a good role in supporting teachers' teaching work. For example, teachers can use the mobile terminal to sign in students so as to judge students' classroom attendance, use the data terminal to issue practice questions, which can effectively view students' answering thinking based on their answering records, and prevent behaviors such as copying homework and students' late or even nonsubmission of homework that exist in traditional education, and release the daily essential word quantity through the mobile terminal to view students' word reserve. This is equivalent to dividing the teacher's responsibilities more clearly. The teaching work and the amount of students' learning are quantified in chunks, which provides a good

quantitative reference for the later evaluation of teaching work. Synergistic human-machine development artificial intelligence is, after all, a software system developed by human beings. From the perspective of science and technology, AI education has both its human side and its limited side. Therefore, the use of AI in teaching usually reflects a clear human-machine synergy, with the teacher still playing a major role in education and AI serving as a supporting role for meeting the teacher's daily teaching needs [9]. As shown in Figure 1, AI can perform data mining by recording and analyzing learners' historical data and integrate the data through deep machine learning in order to do further in-depth analysis and research. Specifically, AI can form a basic modeling of English learners based on their basic profiles (e.g., age, gender, learning experience, and cognitive level) and then refine their learner types based on their English learning profiles, social profiles, and other profiles to provide technical support for creating a personalized English teaching model [10].

2.2. Teaching Process and Evaluation. Teaching process and assessment is shown in Figure 2.

Modern education focuses more on the personalized development of students and their overall development. To achieve individualized development of students, the first step is to guide them to master individualized learning methods [11]. The prerequisite of so-called personalization is to combine different students' learning situations and not to generalize, but to differentiate education for different students. Under traditional education conditions, a teacher needs to face dozens of students, making the realization of differentiated teaching fraught with difficulties. But with the artificial intelligence platform, each student's learning dynamics can be recorded on the system in real time, and teachers can understand the learning level of each student based on his or her learning record so as to guide students to conduct targeted practice. For example, a student's learning record shows that he often makes mistakes in the passive voice, so the teacher can understand it in time through the record on the teaching side and at the same time can send relevant exercises through the mobile side to give him one-on-one guidance. At the same time, the actual situation of different students in the system is used to establish different methods of teaching, which is conducive to the improvement of teaching efficiency. As shown in Figure 2, the LMS software based on artificial intelligence technology can provide technical support for the whole teaching process [12].

Language skills include the four skills of listening, speaking, reading, and writing as well as the ability to use these four skills together. Listening is one of the ways for learners to input a large amount of language knowledge, and speaking is the main channel for language expression. Therefore, listening and speaking skills are the basis of language use ability, and listening and speaking lessons are also an important type of lesson in the English curriculum. For most primary school students in China, elementary school is the beginning stage of English learning. In

elementary school English teaching [13], developing students' listening and speaking skills plays a crucial role in the development of students' comprehensive language skills. However, there are still some problems in primary English listening and speaking teaching; for example, some teachers still focus more on cultivating students' test-taking ability and ignore cultivating students' listening and speaking ability; the English classroom lacks real language context, plus the influence of the mother tongue, making the English language communication environment relatively lacking; some teachers still rely on mechanical drills, and the classroom listening and speaking activities lack interest and variety, which cannot effectively stimulate students' willingness to participate in listening and speaking activities; students receive knowledge passively in the classroom, and their higher-order thinking is not effectively developed. The concept of deep learning originated in the field of artificial neural networks and has been gradually applied to the field of education [14]. Traditional shallow learning is a more mechanical and passive way of learning, ignoring the internal connection and transfer of knowledge. In contrast, deep learning refers to students' use of multistep analysis and processing strategies, such as conceptual transformation, cognitive structure development, resource interaction, and reflective reconsideration, in order to gain a deeper understanding of knowledge. In essence, deep learning is an active, inquiry-based, and comprehension-based learning style that requires learners to use higher-order thinking wisely to achieve effective transfer and application of knowledge. Deep learning advocates that students learn on the basis of understanding and then connect old and new knowledge and realize the transfer and application of knowledge, thus helping students develop their creative thinking, critical thinking, and other higher-order thinking skills. The necessity of practicing deep learning in listening and speaking teaching English curriculum standards points out the fact that cultivating students' observation, memory, thinking, imagination, and creative spirit is one of the basic tasks of the English curriculum at the basic teaching stage, which coincides with the essence of deep learning. The whole teaching process can be supervised with the help of AI, and structural and indicator assessments of teaching activities can be made and fed back to the teaching and learning terminals of teachers and students in a timely manner to promote the construction of the whole ecological teaching activities scientifically and effectively. It can be said that AI plays a decisive role in the whole teaching session (including the formulation of teaching contents, the development of teaching activities, and learning and process assessment). Deep learning makes the teaching link no longer a closed system but evolves into an open loop in an evolving spiral. Nevertheless, we need to recognize that the AI platform only creates a new environment for the ecological teaching of college English. After all, language teaching is a human-centered activity, and ecological college English teaching must comply with the law of second language acquisition and coordinate the relationship between teachers and students and their interaction with the teaching environment to ensure a dynamic and balanced relationship for its benign

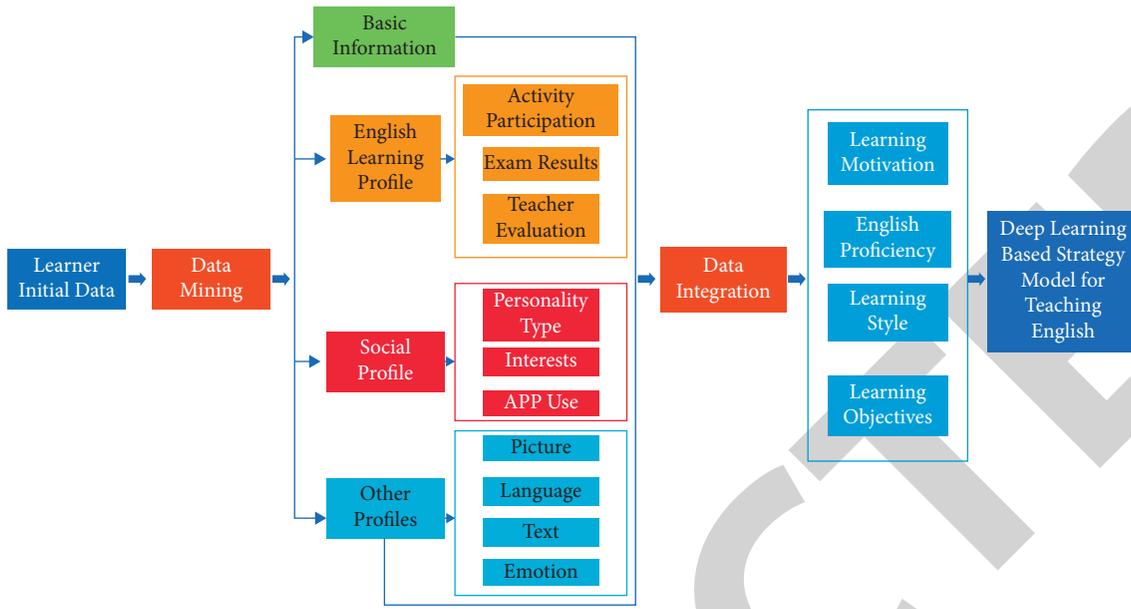


FIGURE 1: English informatization teaching strategy framework.

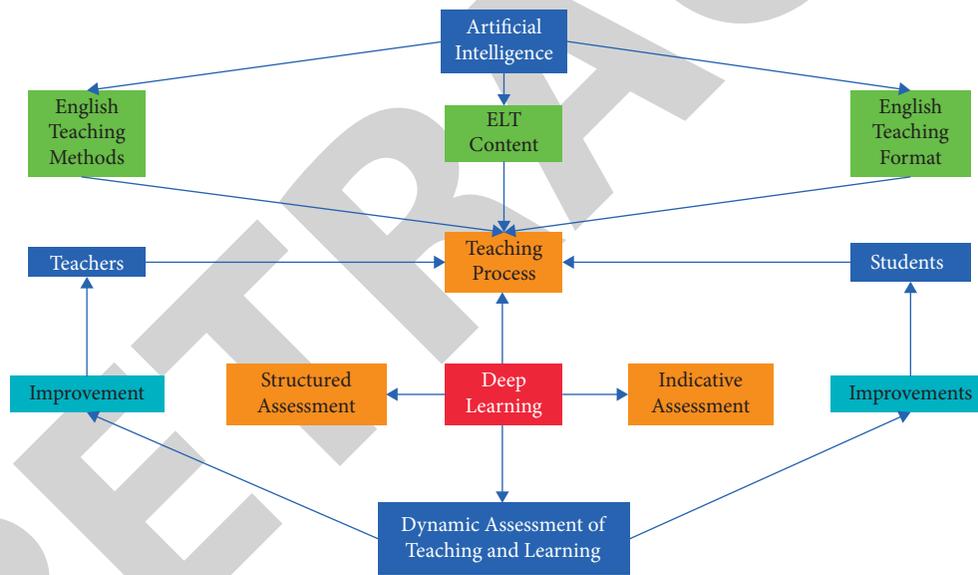


FIGURE 2: Teaching process and assessment.

development. The intervention of artificial intelligence enables teachers and students to interact and collaborate on an intelligent platform and build an open, holistic, and sustainable virtuous language learning ecology, allowing students to generate knowledge and skills in a dynamic way and to perceive and internalize them in the process of interactive experience. Although the powerful technology supports us in sketching the future picture of college English teaching, how to make it a reality remains to be further thought and explored. In general, we need to follow the following “changes” and “constants” in university English teaching integrated with AI: the way English learners learn changes (i.e., more emphasis on “contextual” and “interactive” learning, “interaction,” “experience”) and the realization of a

native language environment or near-native language environment on top of the platform created by technology; English learning is moving towards ubiquitous learning. The role of English teachers needs to be changed to become intelligent classroom designers, organizers, and leaders of activities; their practical knowledge needs to be updated to become a lifelong learner with subject content knowledge and pedagogical knowledge and adept at using technology for blended teaching. Their practical knowledge needs to be updated to become lifelong learners who have subject content knowledge and pedagogical knowledge, and are adept at using technology to carry out blended learning; their assessment methods change; that is, they no longer use the “one-test-for-life” summative assessment, but fully use

the real-time monitoring function of big data to model and profile learners so that assessment becomes both the temporary end of the learning task and the new starting point of the next task. In the AI-assisted classroom ecosystem, what remains unchanged is the “learner-centered” approach, with the teacher being the guide and the technology being the intermediary; the ultimate goal is to equip learners with independent learning, self-directed learning, and problem-solving skills through “scaffolding.” The ultimate goal is to equip learners with the awareness and ability to learn independently and solve problems through the role of “scaffolding.”

3. System Analysis and Design

In this section, a deep learning-based English informatics teaching system is designed to develop a deep learning-based scoring prediction model. Where we analyze this system, we discuss the framework design besides the system functional design and finally the overall model design.

3.1. System Analysis. With the increasing number of courses published on the English informatics teaching system, users are easily overwhelmed by the large number of course resources, which raises the difficulty of obtaining the resources they need. The deep learning-based English IT teaching intelligent strategy system can significantly improve the above problems. The system is based on deep learning intelligent recommendation technology that can extract the required information from the complicated information and also make user recommendations based on log information. To date, recommendation systems have received a lot of attention and have a wide range of applications. Although traditional recommendation methods can accomplish the recommendation task, they have limited effect on the problem of cold-start and Xi-number matrix. The hybrid recommendation method that incorporates multiple heterogeneous information can alleviate the above problems, but it also faces challenges when the auxiliary information is large-scale, multimodal, data heterogeneous, data sparse, and unevenly distributed. There are users with different rights in the English education information system: administrators and learners. Different users have different transparency to the system. Learners can register to learn, select and browse courses and online experimental cases, and post and reply to posts in the forum. The administrator has the highest authority role. The corresponding functions are key information management (management of students, main course information), user management (user rights and information), learning resource management (course resources, video resources), background management, and information analysis.

3.2. Overall System Framework Design. The deep learning-based English informatics teaching strategy system contains various subsystems and business functions, which are also divided into many modules and components according to the componentization and modularization idea of Vue.js.

The coupling between the various functions of the componentized system is reduced, and there is a qualitative change in reusability. The system consists of four layers, namely, the system portal layer, the application module layer, the functional module layer, and the data storage layer.

(1) System portal layer: it provides different services for different users. Learners can learn video, browse course materials, and ask questions online; administrators can manage learning information, course resources, and answer questions. (2) Application module layer: it describes the implementation steps of each module operation: vue.js for front-end development, vue-video-player open source plugin for video playback, Axios for HTTP requests, and deep learning model for data processing and analysis. (3) Functional module layer: it expresses and divides the sub-modules with different functions and work with data model for data processing and analysis. Deep learning model is for data processing and analysis. (4) Functional module layer: it expresses and divides the submodules with different functions and connects with the data layer to provide information transfer services for the operation of the data storage layer. (5) Data storage layer: it stores information about different users and the system’s information. It includes student information, forum information, course information, and management information.

3.3. Overall System Functional Design. The system is based on B/S architecture, using MVC model, with the front-end implemented by Vue.js framework and the back-end built with Spring Boot. The online learning system is developed around the design of networked, diversified, and intelligent student learning. (1) Student personalized learning recommendation module through the collection of student learning content, grades, course preferences, disadvantaged courses, learning records and other characteristics of information, information processing analysis, and for learners to recommend personalized learning courses. (2) Student learning evaluation module through the learning preferences (mainly learning). (3) Online video learning module where the administrator can upload their own learning course videos, students can learn through the online learning system, and the system records the user’s playback and other functions. (4) Online program practice module through the online program practice platform to achieve the relevant course program development practice, to improve the students’ hands-on ability. (5) User management submodule control user login, caching of logged-in information and registration of new users and storage of user information. (6) Course materials management module in this subsystem, teacher users upload course materials, which include PDF, PPT, Word documents, and lab guides. Student users can download these course materials, which is an indispensable part of online learning. (7) Online communication submodule learning communication and experience sharing with classmates and teachers by posting replies in the forum, and so on. (8) Knowledge map display module constructing course knowledge maps to facilitate students’ intuitive learning and querying of materials. This learning system

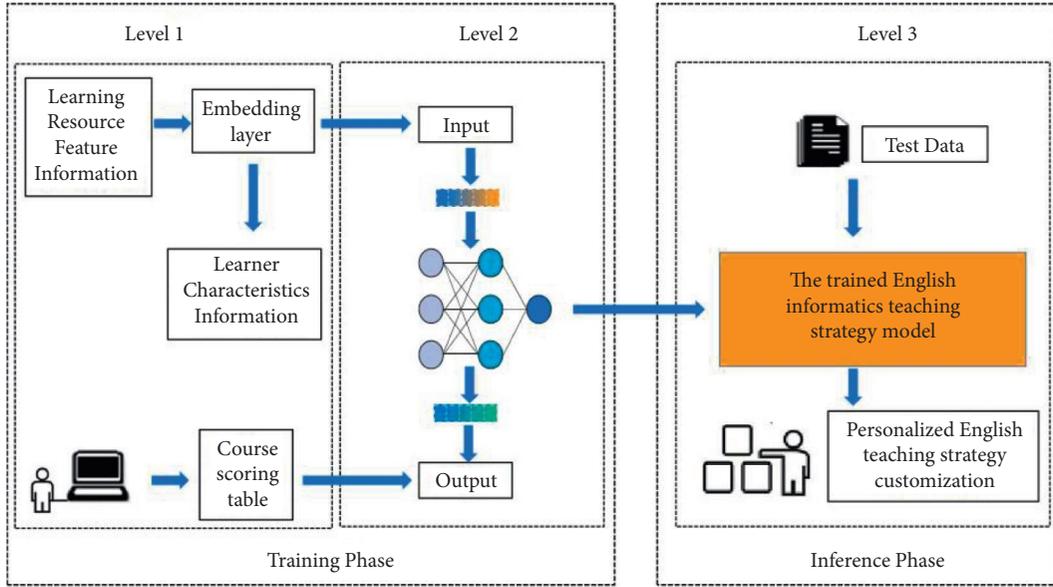


FIGURE 3: English informatics teaching strategy model.

involves a variety of modules: user login and registration, online learning, online experiment, resource sharing, online communication, and other functions. Among them, online learning includes online video learning, course materials such as PPT, Word documents, and lab guide learning, which can meet students' various personalized needs and improve learning efficiency.

3.4. Overall Model Design. English informatics teaching strategy model is shown in Figure 3.

In this paper, a neural network-based rating prediction model is designed. This model incorporates a deep learning model based on word embedding and text convolutional networks, makes improvements in the feature vector with users as well as learning resources, and uses deep learning to mine hidden interest features on this basis. The model is also trained with the help of the user's historical rating information, and the scores are used to express a potential association between the user and the learning resource. Finally, the performance of the recommendation effect is improved, and the user experience is enhanced. The model is divided into two parts: training and recommendation (Figure 3).

The extraction of the learner feature vector and the learning resource vector is performed during the training process. The learner feature vector is extracted using word embedding's to take the user's ID, name, and preferences as input to form a vector that can model a user's features. After this, the user feature vector is trained through a two-layer fully connected layer to extract the potential relationships between each user feature. The extraction of the learning resource feature vector is performed through a text convolutional network to obtain the course noun vector, the course id and course type are passed through an embedding layer to model the feature vectors of different attributes, and finally the link integration of the attribute vectors is performed using a fully connected layer. The first layer of the

text convolutional network is the input layer, and this layer is a matrix of words in sentences arranged in the corresponding top and bottom order, establishing the sentence matrix:

$$\mathbf{A} = [x_1, x_2, \dots, x_m, \dots, x_n]. \quad (1)$$

The second layer of the network is the convolution layer, and each word in this layer forms an overall embedding matrix through the individual vectors of the embedding layer. By the dot product of the input matrix and the filter plus the compilation term, the convolution operation is formulated as follows:

$$h_i = f(W_1 \cdot x_{i:j+l-1} + b). \quad (2)$$

Finally, the output is performed using the activation function, which is as follows:

$$f(x) = \begin{cases} x, & x \geq 0, \\ 0, & x < 0. \end{cases} \quad (3)$$

The third layer is the pooling layer, which uses the Max-over-time-Pooling method. This method extracts the one-dimensional features processed in the previous step and extracts the largest value in the convolution window as the feature value of this window:

$$\hat{s} = \max[h_1, h_2, h_3, \dots, h_{n-l+1}]. \quad (4)$$

The fourth layer is the fully connected + softmax layer, which controls the training fit by using the properties of the Dropout technique and restricts the weight parameters of this layer with L2 regularization. This is done to prevent the fit from being reduced due to the adaptive nature of the hidden units:

$$\hat{y} = \arg \max[W_2 \cdot \hat{s} + b_1]. \quad (5)$$

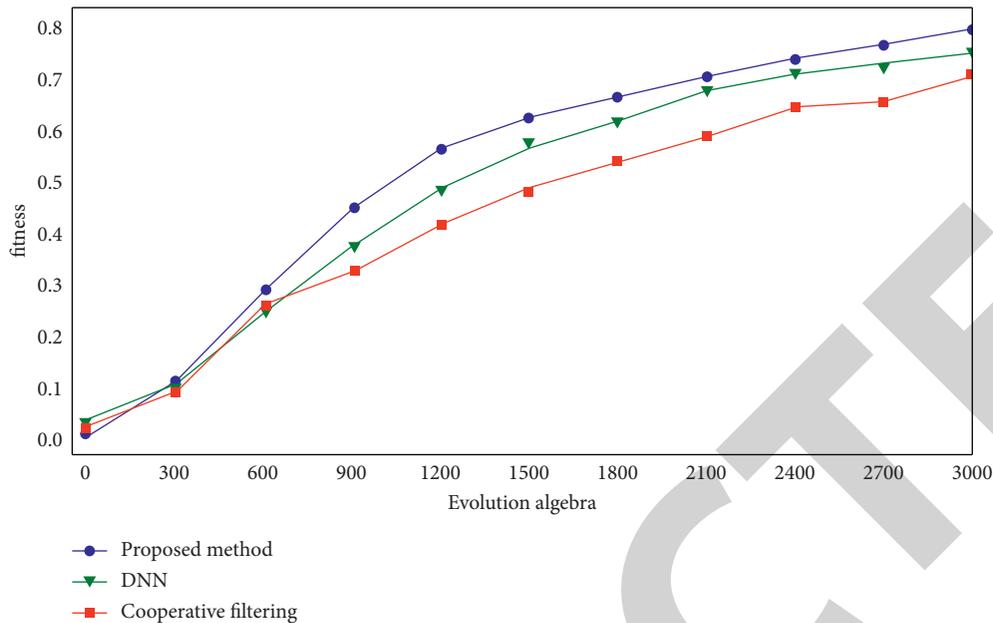


FIGURE 4: The experimental results of iteration.

TABLE 1: Training results table.

Data set category	Number of datasets	Accuracy rate (%)	Recall rate (%)	F1 (%)
edX	26000	78.34	77.56	77.95
Online learning system	10000	72.71	71.96	72.33

After four layers of processing, the vector features of the learning resource title are obtained.

4. Experimental Results

To verify the effectiveness of any algorithm or model, experiments must be done. So, in this paper, we use this section for the experimental results.

4.1. Experimental Data. This paper uses the Open edX dataset, which contains data related to 16 ELT courses offered by Harvard University and MIT on the edX platform from 2012 to 2013. Dozens of attributes are provided, including course data, learner information, and learner behavior characteristics.

4.2. Experimental Results. In order to further verify the effectiveness and optimization performance of the proposed deep learning algorithm for the English informatics teaching strategy model, this paper conducts a comparison analysis of the quality recognition error MSE of three algorithms, a comparison analysis of the convergence under the same number of iterations and initialization parameters, and a comparison analysis of the accuracy of the quality recognition of the algorithms. The convergence curves are shown in Figure 4.

A portion of the test set was taken as the validation set for verification, and the course ratings were compared with

the target values, and the ratings of the contents in the rating scale of the data set were compared, with a final accuracy of 78.34%, a recall of 77.56%, and an F1 value of 78.56% (Table 1).

5. Conclusion

The deep learning-based English teaching strategy system is based on big data analysis and intelligent processing to study the behavior and personality characteristics of students in the process of learning English and make personalized recommendations based on the intelligent guidance function in the system. This system takes the most basic information about students and their own learning conditions as the basis for deep excavation so as to build a model of English learning behavior and experience, and through the personalized analysis of learning conditions, it can also make students' enthusiasm for learning English rekindled. The online English learning and teaching recommendation system can recommend more in-depth learning methods and content to students and specific classes and generate an intuitive image of learning changes after the teaching is completed so as to achieve accurate and high-quality teaching.

Data Availability

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

Conflicts of Interest

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

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