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Design of University English Teaching Effect Evaluation Method based on Intelligent Algorithms

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ABSTRACT

With the rapid development of artificial intelligence technology, the design of evaluation methods for university English teaching effects based on intelligent algorithms has become a hot topic. To reduce evaluation errors in English teaching effects, a university English teaching effect evaluation method is proposed by combining intelligent algorithms. First, English teaching evaluation data is collected, and an intelligent selection of evaluation indicators within a calibrated scope is made. A versatile intelligent algorithm teaching effect evaluation model is established, using a stepwise target evaluation method for implementation. Through testing, it was found that the algorithm designed can effectively reduce the errors in teaching evaluation, even reducing them to below 1.5. This indicates that it can significantly enhance the overall evaluation accuracy.

Keywords: Intelligent Algorithms, University English, Teaching Effect, Teaching Evaluation

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1. Introduction

In the present era, due to the rapid development of the Internet and intelligent technology, coupled with deep educational reforms, there has been a significant transformation in traditional academic models and assessment standards [1]. Currently, many people still rely on metrics such as scores and practical classroom performance to gauge the quality of English education. However, this approach often leads to deviations in test data, resulting in less objective and accurate test conclusions [2]. By introducing advanced methods, we can effectively enhance the quality of university English classes. These methods include simulated annealing, genetic algorithms, neural networks, and the sparrow method, all of which help us better understand classroom situations and predict classroom quality more accurately [3]. Through these computations, we gain a better grasp of

the overall classroom atmosphere and use these calculations to improve classroom quality. As time progresses, we must adjust our assessment methods to accommodate the ever-changing educational landscape. We must consistently refine our assessment approaches to better support our educational reforms [4].

With the continuous development of globalization, the importance of English as a global lingua franca is increasingly evident. University English teaching is a crucial avenue for cultivating internationalized talents, making the assessment of its teaching effects particularly important. Traditional English teaching assessment methods primarily rely on teacher observations and student exam scores, which are subject to subjectivity and bias. In recent years, as technology has advanced rapidly, there has been a growing focus on assessing the effectiveness of English teaching methods based on intelligent algorithms [5]. The significance of English teaching effect assessment methods based on intelligent algorithms lies in the following aspects:

Enhancing assessment accuracy and reliability: Intelligent algorithms can process vast amounts of data, conduct pattern recognition and trend analysis through machine learning algorithms, thereby assessing English teaching effects more accurately. Objectively reflecting student English abilities: Intelligent algorithms can comprehensively consider various student performances, such as exam scores, oral expression abilities, and classroom participation levels, leading to a more objective reflection of students' English abilities. Adopting advanced intelligent algorithms to gauge English classroom effectiveness prevents teachers from making the same mistakes and allows them to adjust classroom approaches based on real situations, ultimately achieving better classroom outcomes. Promoting English teaching reform: English teaching effect assessment methods based on intelligent algorithms can offer a reference for English teaching reform, thus advancing the informatization and intelligentization of English teaching. In summary, research on English teaching effect assessment methods based on intelligent algorithms holds significant importance for enhancing English teaching quality and promoting English teaching reform.

2. Artificial Intelligence Technology Applied to Teaching Evaluation

Learning is the process through which students acquire information and skills by engaging in interactive activities that bridge raw knowledge and experiences. Intelligent instructional systems are employed in classroom environments to facilitate learning activities. Students can self-organize, formulate, and implement learning plans, independently select learning strategies, control the entire learning process, and engage in self-assessment during this process [6]. As the use of artificial intelligence and other technologies in education evolves, the focus on instructional support tools, such as intelligent instructional systems, has expanded throughout the educational landscape. Intelligent learning environments have developed into global centers of research. According to the author, establishing intelligent learning environments contributes to the expansion of educational informatization and the creation of a balanced educational ecosystem, both of which are crucial for the development of a learning society. Many scholars have conducted extensive research in this regard.

Researchers have demonstrated how artificial intelligence data mining techniques can be utilized to extract subjective information and perform sentiment analysis in English discourse. The author employs deep learning algorithms to extract discourse features and classify them, thereby identifying subjective information within the discourse. Experimental results indicate that this method effectively identifies subjective information in English discourses and conducts sentiment analysis [7]. Another study examines the application of artificial intelligence data mining techniques to extract subjective information from English discourse. The author employs a deep

learning algorithm that combines convolutional neural networks and recurrent neural networks for feature extraction and classification of English discourses. Experimental results demonstrate the effectiveness of this method in identifying subjective information in English discourses and its application in text sentiment analysis and related fields [8]. Researchers have reviewed existing methods for mining subjective information in English discourses, including rule-based methods, machine learning-based methods, and deep learning-based methods. The author highlights the excellent performance, high accuracy, and robustness of deep learning methods in identifying subjective information within English discourses [9]. A deep learning-based model for analyzing the subjectivity of English discourses is proposed. The author employs a deep learning algorithm that combines convolutional neural networks and recurrent neural networks for feature extraction and classification of English discourses. To enhance the model's performance, the author also employs a self-attention mechanism to weight the keywords within the discourse. Experimental results indicate that this method effectively identifies subjective information in English discourses and enhances the accuracy of analysis [10].

In summary, these studies primarily investigate how artificial intelligence data mining techniques can be utilized to extract subjective information from English discourse and perform applications such as sentiment analysis and text classification. Research findings suggest that English discourse subjectivity analysis models based on artificial intelligence data mining techniques exhibit high accuracy and objectivity, providing new tools and means for analyzing English discourse and its applications.

3.Theory and Method

3.1 Reading-Writing Conversion Module

Through multimedia resources, speech recognition technology, and the conversion between speech and text, this English intelligent teaching system enables various forms of language communication. In this article, we will focus on discussing the language communication module, as depicted in Figure 1. Individuals seeking to learn English through the intelligent teaching system must register for courses online, assess their performance, and then progress to the next level of learning. Although learners can acquire information from diverse perspectives, and their features, requirements, and practical experiences may vary, there are many similarities that learners can discover. Therefore, we can consolidate various tasks within the learning process into a comprehensive learning model to better grasp the knowledge. By adopting a hierarchical structure, we can narrow the focus of the curriculum to a smaller scope and progressively delve deeper into its key aspects.

3.2 English Data Collection

Before developing a method to evaluate the effectiveness of University English teaching, it is necessary to establish a comprehensive evaluation environment and collect data using specific techniques. To achieve this goal, we have installed a large number of data collection nodes on the campus network, each of which is independent and closely related in practical applications. Through the daily use of the teaching platform, each node can effectively achieve targeted extraction, forming a dynamic data collection mechanism. This enables the teaching platform not only to meet teaching needs but also to achieve four major functions: interaction, assessment, and evaluation, and it can be evaluated through formula 1. To better adapt to the teaching characteristics of the English subject, we need to redesign the data collection mechanism and develop instructions with data mining capabilities.

$$x_i^{t+1} = x_i^{(t)} + \eta \oplus L(\lambda)(i = 1, 2, \cdots, n) \quad (1)$$

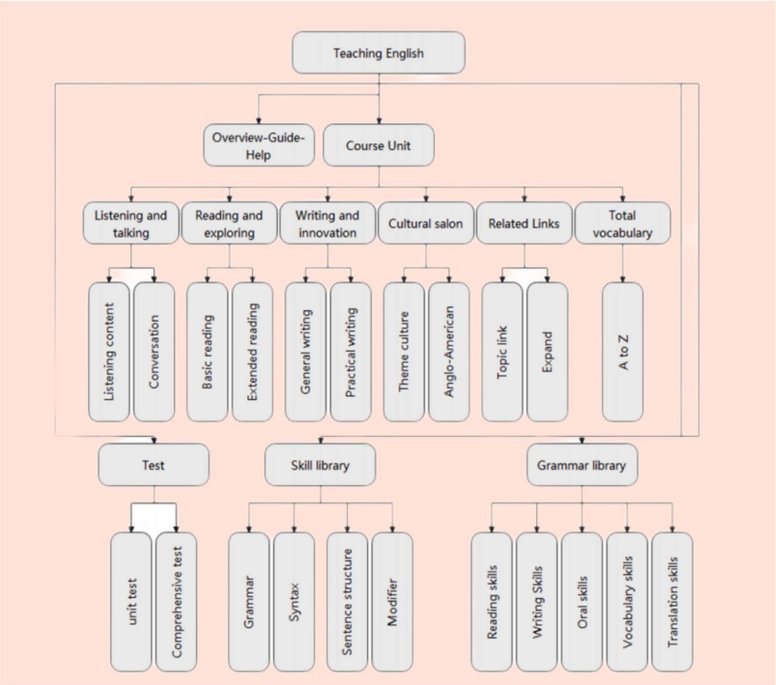

Figure 1. Functional Structure of the Read Write Conversion Module

In everyday English teaching, teachers can use a combination of live broadcasting and recording to deliver knowledge. Under this approach, students' classroom performances are recorded at intervals and converted into a transmission protocol that the system can understand. The resulting test data and information are then sent to the appropriate locations to serve as the basis for subsequent teaching assessments. During the data evaluation process, teachers should categorize the data into practical, interactive, learning-oriented, and evaluative aspects, constructing dynamic testing dimensions based on these attributes. Additionally, classroom engagement and teaching outcomes can be analyzed by observing the frequency and quality of student participation. This enables the uniform categorization and processing of teaching assessment data, facilitating multidimensional data collection and integration for a solid foundation in future teaching evaluations.

3.3 Building a Versatile Intelligent Algorithm Teaching Effect Evaluation Model

By employing advanced techniques, we can automatically determine evaluation indicators and combine them with sophisticated algorithms to create a comprehensive and measurable model for evaluating educational effects. Through synthesizing the collected information, we can accurately determine the weights for each evaluation, as shown in formula 2. In this formula, D represents the weight of evaluation, ϕ denotes the transformation difference, r stands for the value of each unit, t represents the characteristic value of each unit, and i represents the testing and evaluation period for each unit. With these values, a critical evaluation indicator can be determined, and fractal evaluation can be employed to establish a more comprehensive educational assessment approach. Initially, a genetic algorithm of fractal evaluation is utilized to estimate the square root value of the overall population. Through the application of neural networks and the sparrow algorithm, the average level of English teaching can be computed. To enhance evaluation, preset data collection nodes can be used to continuously gather relevant assessment data within specific timeframes, thereby implementing various intelligent evaluation methods. For a comprehensive evaluation of English teaching, multiple foundational

assessment indicators need to be established. Simultaneously, variations in daily teaching objectives should be considered, and diverse assessment modes should be adopted to formulate corresponding evaluation goals and criteria. This establishes a targeted assessment system, ensuring more precise and reliable evaluation outcomes by adjusting internal indicator data.

$$D = 0.5\vartheta^3 - \sum_{i=1} r\left(t^2 + 1.2i\right) \quad (2)$$

3.4 Hierarchical Objective Evaluation Implementation Design

By using the hierarchical objective evaluation method, we can categorize teaching evaluations into different categories based on their importance and develop corresponding evaluation standards. In order to better implement evaluation, we can create multiple different evaluation levels based on different teaching objectives, thereby achieving dynamic evaluation scheduling. Next, we need to calculate the interaction hierarchical evaluation difference, which can be represented by formula 3. In this formula, F represents the interaction hierarchical evaluation difference, $v1$ represents the evaluation mean, θ represents the evaluation vector, and v2 represents the fuzzy evaluation conversion value. We can transform this evaluation model into a targeted teaching evaluation goal and calculate the optimal solution within the specified evaluation criteria, which serves as a dynamic standard for teaching evaluation in this cycle. Combined with the teaching evaluation goals of each stage, we can continuously adjust the conversion of evaluation levels. By establishing a hierarchical and multi-objective evaluation system, corresponding guiding objectives are formulated based on changes in evaluation results to evaluate the effectiveness of English teaching.

$$F = \int\left[2.5v_1 + \left(\theta^3 \times v_1 v_2\right)\right]dv \quad (3)$$

4. Evaluation Effect Analysis

4.1 Experimental Design

To ensure the accuracy of the final evaluation results, we selected English courses at School A as our primary target for testing. We conducted evaluations using a comparative approach, including traditional random forest methods, big data analysis methods, and the intelligent algorithm method proposed in this paper. At School A, we chose four classes as our evaluation subjects and established an evaluation period. The weight of evaluation was determined to be 1.35, and a fractal simulation evaluation process was created to construct a dynamic assessment environment for formulating foundational teaching assessment indicators. In comparison to traditional random forest and big data analysis teaching evaluation tests, the evaluation errors of the intelligent algorithm teaching evaluation test group proposed in this paper were significantly reduced, even below 1.5. This indicates that the intelligent algorithm exhibits remarkable advantages in practical evaluation, significantly reducing evaluation errors, enhancing evaluation efficiency, and holding significant practical value. Subsequently, we need to integrate the pre-established evaluation standards with the corresponding English courses. In daily teaching, we can collect and organize teaching data through various means. Using the testing environment we established, combined with actual teaching evaluation standards, we can employ intelligent algorithms for personalized evaluation. By assessing the English proficiency of classes over a period and comparing it with the initial level, we can determine the actual teaching gap. We enhance the feature recognition process through improvements to the interpolation method and construct an English teaching system based on artificial intelligence. This English teaching system described in this paper can alter the traditional teaching approach, adjust teaching strategies in real-time based on student status, and establish a targeted assessment system by adapting to changes in daily teaching objectives and using diverse evaluation modes. This system yields more precise and reliable evaluation results by adjusting internal indicator data.

4.2 Analysis of Experimental Results

Through the adoption of advanced intelligent algorithms, we can minimize data calculation errors during the evaluation process and accelerate evaluation speed. This enables us to continually expand the scope of English teaching evaluations and incorporate more robust and secure features into our teaching evaluation system. Additionally, by considering the content being evaluated, standards, and their mutual influences, we can devise various assessment levels that better reflect the true achievements in English teaching. In this way, our teaching evaluation system can become increasingly systematic and comprehensive, narrowing the gaps between different elements, which is pivotal to our work. As shown in Figure 2, from the perspective of theoretical verification results, the results of the experimental group and the control group are similar. In terms of distribution, the system can effectively improve the theoretical scores of students with less severe learning attitudes. Corresponding conclusions can be drawn regarding the performance of low-level experimental class students in comparison to the control class. In the experimental operation section, the results of the experimental group outperformed the control group in various aspects.

Figure 2. Results of University English Theory Test

After iteration, we found that the optimal individual is adversarial. An intelligent algorithm is a widely used population evolution algorithm that possesses encoding ability, adaptability, selectivity, crossover, and mutation. Therefore, we demonstrate the effectiveness of this algorithm by using an improved genetic algorithm based on t-distribution. The advantages of intelligent algorithms are not only reflected in genetic algorithms but also in expanding their application range and improving their efficiency by studying different types of swarm evolutionary algorithms. As shown in Figure 3, the green area represents the statistical part of the control class, the yellow area represents the statistical part of the experimental class, and the yellow area surrounds the green area, indicating that the results of the experimental students significantly exceed those of the control class. From the above analysis, it can be seen that the system constructed in this article is used for teaching English in universities. Especially in the experimental teaching section, it can play an essential role in effectively improving students' English grades.

This study analyzed and summarized the characteristics of English classroom teaching and constructed an intelligent algorithm network open teaching platform based on facial recognition and artificial intelligence. By employing the novel direction perturbation operator, we significantly improved the effectiveness of traditional adaptive intelligent algorithms. This new technique not only enables the previous generation of individuals to adjust their evolution probabilities according to their optimal fitness more easily, but also significantly reduces

algorithm complexity, enhances convergence effects, and improves system robustness. The platform presented in this paper is primarily designed for use in higher education English teaching. Research findings indicate that the system developed in this paper holds practical value in English teaching. Mainly, it can play a significant role in experimental teaching, effectively enhancing students' English proficiency.

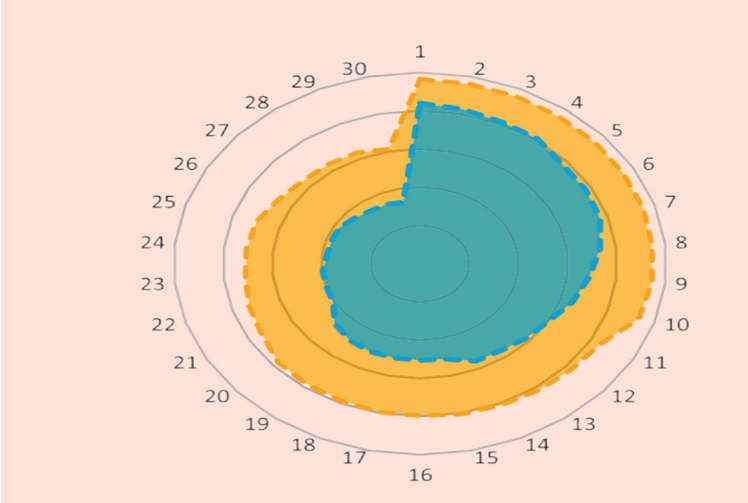

Figure 3. Radar Chart of Experimental Results

5. Conclusion

The scarcity of high-quality teaching resources is becoming increasingly severe. The widespread use of intelligent algorithms in English education has elevated students' overall learning levels, enabling teachers to invest more time in educational research, student understanding, and effective teaching. This also allows teachers to allocate more time to care for and assist students, design and deliver high-quality, personalized training, and pursue their professional development, ultimately leading to the continuous improvement of teachers' overall quality. We utilize AI technology in the construction of English teaching systems, creating an intelligent English teaching system to enhance the quality of English education. By combining interpolation methods with AI, we enhance feature recognition and utilize AI to develop the English teaching system in this study. Leveraging feature recognition, the English teaching system proposed in this research can replace traditional teaching methods and adjust teaching techniques in real-time based on student status. Overall, the results provided in the study validate the effectiveness of the suggested method based on intelligent algorithms. Future research areas include, but are not limited to, the real-time creation of the proposed model using AI, testing the proposed model with various datasets to assess system reliability, and exploring different optimization strategies for the proposed model.

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