The Application of Artificial Intelligence in Computer-Assisted College English Teaching Tasks

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Abstract. With the continuous improvement of the international status of English and the expansion of the scope of English, more and more countries have carried out English teaching. China is a country that started English education relatively early. Early English education was mainly based on exam-oriented education. It emphasized basic English grammar knowledge and English listening content. It paid less attention to English communication ability. With the advancement of computer technology, computer-aided design has been applied in English teaching. It can display English-related human geography and English knowledge in the form of pictures, texts and videos. However, the traditional computer-assisted English teaching mode also limits the efficiency and interactivity of English classrooms. This research explores an intelligent computer-aided English teaching model by combining relevant algorithms in the field of artificial intelligence. It mainly uses ACNN and GRU algorithms to evaluate three aspects of student expression information, student action information and English teaching content information in the computer-aided teaching model. The research results show that the ACNN-GRU method is more suitable for evaluating the relevant information of computer-aided English teaching than the single ACNN method. The largest evaluation error is only 2.27% from the student action information of computer-assisted English teaching.

Keywords: Artificial intelligence; Computer-aided design; English teaching; Student information.
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1 INTRODUCTION

English is an international universal language, whether in international political exchanges or in the process of international trade, English is a relatively common official language. Although the number of English speakers is not as large as that of Chinese speakers, there are many countries

where English is used. This means that the number of countries where English is the mother tongue is in the majority [1]. At the same time, most of the countries with developed international trade or international economy use English, which has established the international status of English. At the same time, English language learning is also relatively simple compared to Chinese, French and other minority languages. As a major international trade country, China has also carried out a lot of English teaching work [2]. In China, primary education has already begun to contact English education. No matter which stage of the test-taking process, English occupies a relatively large proportion, which shows the importance of English teaching. In the early days, English education in China was often carried out in the form of books and blackboards, which was an indoctrinated language education model. This educational model is only suitable for various English test-taking tests. In the long run, this English teaching mode is not suitable for the development of the international society.

With the development of science and technology and the emergence of various teaching hardware equipment, computer-aided systems have also begun to be carried out in the teaching of different subjects. The computer-aided system can teach the subject content that needs to be displayed in the form of pictures or videos. Teaching methods in pictures or video are often more impressive, which is an improved teaching mode. The teaching method of text mode is only suitable for recitation and memorization. From the perspective of application, the form of book text is still not suitable for English teaching work. English teaching not only requires students to memorize and recite relevant grammar and sentences, but also requires students to apply English grammar proficiently to understand and communicate relevant knowledge. English teaching also has relevant geographical and humanistic background knowledge, which needs to be understood in the form of video. Computer-aided systems can display relevant humanities in English-speaking countries [3]. This greatly improves students' understanding of English humanistic feelings, which makes it easier to understand the techniques of English expression and the emotions expressed in English. The computer-aided system can obtain relevant English teaching content from different places, and it can also be continuously updated, which can enrich the range of students' English knowledge. Compared with the English teaching work in the form of books, the computer-aided system has more advantages and effectiveness. Therefore, the computer-assisted English teaching mode has become a new and practical English teaching method.

At present, the computer-assisted English teaching mode also has certain drawbacks. It can only transmit the prepared courseware content; it cannot realize the intelligent teaching mode. With the development of the Internet, more and more English knowledge can be shared. The Internet also has more suitable and richer English learning knowledge, which makes it possible to realize an intelligent computer-assisted English teaching mode. Artificial intelligence-related theories can select different English teaching knowledge according to students' performance and needs. Once the knowledge of English teaching is obtained and evaluated from the Internet, it can be displayed to students and teachers through the computer-assisted English teaching system. This is also a more favorable way for teachers to prepare lessons. The development of artificial intelligence technology also makes it possible to realize an intelligent computer-aided system.

2 RELATED STUDIES

Li [4] has explored a new type of computer-aided English learning system using an improved fuzzy hierarchical neural network approach. This intelligent English teaching method can realize the interactivity of English, and it can also provide the efficiency of language learning. This intelligent English assistance system can also contain rich human-computer interaction systems. It is also easy to implement courseware content for English teachers. Xie [5] has found the problems of lack of active learning and inefficiency in traditional English teaching methods, and it applies computer-aided systems to the work of English language teaching. It explains in detail the idea, classification structure and courseware design scheme of this system in English teaching. The research found that this method can improve the efficiency of English from 58.6% to 69.6%. This can also balance

the different aspects of students' learning ability. Li [6] has also found that computer intelligence systems are an important means of processing multimodal information. It uses computer-aided system to design a new English teaching method. It also realizes a teaching method by means of cloud computing. It introduces the relevant research on the design, implementation and functional deployment of such a system. Ye [7] organically integrates Internet technology and English teaching work, and he believes that this method will change some of the shortcomings of traditional English teaching. It also introduces the unsuitable places for English teaching in the fusion of Internet technology and computer-aided systems. It also analyzes the principles and characteristics of the combination of computer-aided and artificial intelligence theory, which can maximize the application of English teaching resources. Yue [8] has also found that natural language is increasingly supported and used by computer-aided systems. This provides a good guarantee for English learning. It uses computer aided system to solve the problem of spoken language recognition in English teaching. It also uses natural language processing methods and port detection algorithms to study the teaching of spoken English.

This paper uses the related theory of artificial intelligence to realize an intelligent English teaching mode combined with computer-aided system. In this mode, the computer-aided system will be responsible for presenting the assessed content to the student or teacher. Artificial intelligence-related theories mainly study students' expression information, students' action information and English teaching content. Here, the atrous convolution ACNN and GRU methods in the field of artificial intelligence are applied to evaluate the relevant English teaching content [9]. This is because the relevant information in English teaching work is rich in time and space effects. In order to conveniently introduce the application of artificial intelligence theory and computer-aided system in English teaching, it is divided into 5 different links to introduce. The first part illustrates the advantages of computer-aided systems and artificial intelligence theory for improving English teaching. The second part introduces the current situation of the application of computer-aided systems in English. Section 3 introduces different algorithms and theories and schemes of computer-aided systems in English-related feature research in more detail. The fourth part fully introduces the evaluation effect of ACNN and GRU theory in English teaching related information. The last part summarizes and explains the whole study.

3 THE APPLICATION OF ARTIFICIAL INTELLIGENCE FIELD THEORY AND COMPUTER AIDED SYSTEM IN ENGLISH TEACHING

3.1 Evaluation of Spatial Effects in English Teaching

From the above introduction, we can understand that this research mainly uses artificial intelligence-related theories to explore the relationship between student expression information, student action information, and teaching content information in English teaching and evaluation of Internet information. The matching of these three types of Internet-related English teaching content is a complex nonlinear relationship, which requires the use of the convolutional neural network CNN. At the same time, considering the complexity of English teaching-related information and the extensive amount of data, this research designs a new type of ACNN network to match English teaching information with Internet teaching information [10]. This is the so-called spatial information assessment of English teaching information. The relationship between the three kinds of relevant information in English teaching cannot be found by manual methods, which is also a real-time evaluation problem, which will reflect the advantages of ACNN technology.

ACNN neural network is an enhanced neural network structure of CNN. CNN is the first proposed network structure to deal with complex nonlinear relationships. It has demonstrated the powerful ability of CNN in dealing with different problems, which is also the reason why CNN technology is widely used. However, students' expression information, student action information and English teaching content related to English teaching will involve a large number of information features, which requires a deeper network to evaluate spatial information. If CNN is used to

complete this task, it will require higher computing performance of the computer, which is an economic burden that general enterprises or educational institutions cannot bear. In order to save computing resources and improve the efficiency of English teaching-related information evaluation, it adopts ACNN technology. The difference between ACNN technology and CNN technology is that the convolution operation of ACNN is different. It can choose different hidden layer factors for convolution calculation by skipping. The computer-aided system will display the spatial information effect extracted by ACNN to the students in the form of English knowledge, which has a high correlation with the students' expression, action characteristics and classroom content.

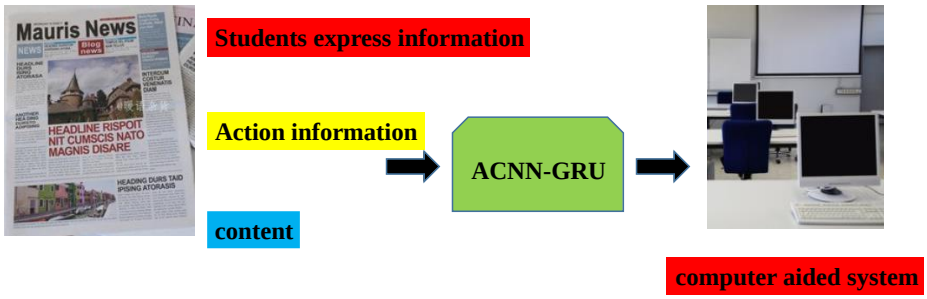

Figure 1: Application scheme of ACNN and GRU method combined with computer-aided system in English teaching.

Figure 1 introduces the detailed ideas of ACNN and GRU theoretical methods in English teaching. The students' expression information, students' action characteristics and teaching content information in English teaching are the data that need to be collected, which is the basis for two different algorithms to evaluate the relevant information. For these large amounts of English-related data, it needs to deal with missing data and abnormal data, which is the first step of this system scheme. When the data is prepared, it needs to input the data into ACNN and GRU in the form of input data and label data, these two algorithms are responsible for different functions and roles. This process is more critical. The manual method will perform the iterative process of observing the artificial intelligence algorithm. It also needs to continuously adjust the relevant parameters in ACNN and GRU according to the verification set related to English teaching. Ultimately, once this AI theoretical model reaches a state of convergence, it achieves the effect of learning the optimal relationship, and the model can be exploited. Computer-aided systems will demonstrate what AI theory has learned, and this is how AI theory is applied in conjunction with computer-aided systems.

3.2 The Effect of English Teaching Time Information Extraction

Through the application of artificial intelligence in the field of language, it can be known that English language is a special case with rich temporal information. The information expressed by students and the characteristics of students' actions have a high relationship with time, which requires the use of temporal feature extraction solutions. The long short-term memory LSTM method is a common algorithm in the field of speech recognition or translation. It can correlate the temporal relationship between the preceding and following languages, which means that the preceding words of the language have an important relationship with the following expressions. Neither human experience nor formulas in related fields can identify and discover these temporal relationships. Therefore, this study fully considers the characteristics of artificial intelligence-

related theories in English teaching, and it considers and designs an informational English-related time information evaluation scheme.

The GRU method is a special case of the LSTM algorithm, which does not have the more complicated time information extraction process like the LSTM. The LSTM algorithm needs to go through four different processes, which generally involve the selection of historical information, the weight assignment and update of historical information, and the fusion and output of historical information and current new ones. This process consumes a lot of computing resources. Both LSTM and CNN are a type of supervised learning. Compared with CNN theoretical methods, LSTM requires huge memory and time. Considering the effectiveness of English teaching needs and the amount of English teaching-related information data, this research designs an evaluation effect algorithm GRU for the time information related to student expression information, student action information and English teaching content information. GRU has also been used in many fields, it also shows higher accuracy and it will save more time.

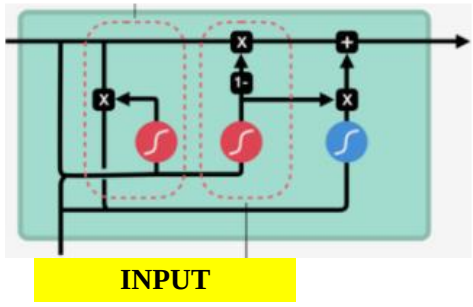

Figure 2: Computer-aided system for evaluating time information related to English teaching.

Figure 2 analyzes in detail the performance of the GRU method in evaluating the student action information, student expression information and English teaching content information of English teaching. These three kinds of information related to English teaching will be input into the GRU network in the form of time series. GRU network and ACNN network are a coherent process, and three kinds of information related to English teaching have been evaluated by ACNN and GRU network successively. This process is also done in a computer-aided system. The GRU algorithm will only include two gate structures, which saves the time of running and iterating the GRU in a computer-aided system. The update gate in GRU will simultaneously complete the selection and filtering of English teaching-related information at different times, and it will determine the historical information to retain. The update gate is responsible for updating the weights of information at different times and outputting new historical information.

3.3 Computational Aided System and English Teaching Data Processing

Through the above analysis and introduction, it can be found that the application of computer-aided system in English teaching in this study is different from the traditional computer-aided system. The computer in the traditional computer-assisted teaching mode only completes the task of displaying relevant content. It can display the teaching content of the pictures or videos that the teacher has prepared, which only improves the knowledge richness of English teaching and it also improves the vividness of English knowledge sex. However, the traditional computer-aided English teaching model cannot completely come from the acquisition and evaluation of English information on the Internet. The computer-aided English teaching model designed in this study will also introduce English-related knowledge from the Internet. This computer-aided English teaching system will also have trained ACNN and GRU related algorithms and optimal weight information. It

will have two functions; one is to display relevant English teaching content. Second, it can complete the evaluation and acquisition of English teaching-related information.

For artificial intelligence related theories, it is to find the correlation between data from the data that already exists. Therefore, the data and the amount of data are important for artificial intelligence theory compared to the relevant parameters in ACNN or GRU. The adjustment of parameters in the iterative process of artificial intelligence-related algorithms will affect the effect of English teaching-related information evaluation to a certain extent. However, the accuracy of the data will affect the direct determinant of the evaluation effect of English teaching-related information. Therefore, before training ACNN and GRU, one of the most important tasks is to adjust for missing data, data distribution, and data anomalies. In general, missing data will be filled with 0 or 1. Abnormal data needs to be corrected by interpolation.

4 RESULTS AND DISCUSSION SECTION

4.1 Analysis of Global Evaluation Effect of Artificial Intelligence Theory

The global evaluation effect refers to the average error of the ACNN method in evaluating all English-related information. The global effect does not just refer to the error distribution of a certain test data. The better performance of AI theory on the entire test set suggests that this AI idea is available. This study chose the form of mean error to demonstrate the effect of the ACNN method in evaluating computer-aided English teaching information, as shown in Figure 3. Through the error histogram in Figure 3, it can be seen intuitively that ACNN can more reliably evaluate three kinds of relevant information of computer-aided English teaching. For the information expressed by students in computer-assisted English teaching, the average error of this part is only 2.53%, which means that the ACNN method can accurately grasp the information expressed by students, and it can use this information to discover the students' feelings on the Internet. Interested in knowledge of English. Although the ACNN method has the largest error in evaluating student action information, it only reaches 2.66%. Although this part of the information is difficult to grasp by artificial intelligence theory, it can also better grasp the learning action information collected by the computer-aided system.

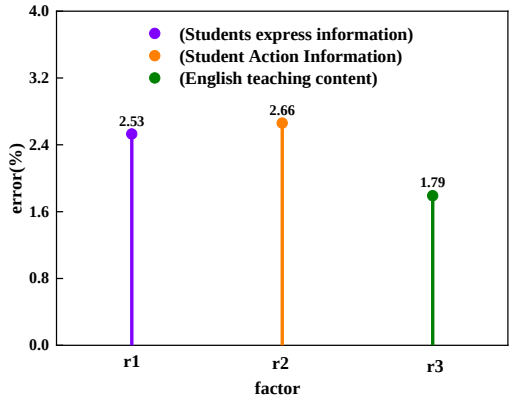

Figure 3: The global error of computer aided English teaching information using artificial intelligence theory.

The above analyzes the effect of a single ACNN method in evaluating computer-assisted English teaching, and this study also compares the performance of ACNN-GRU with a temporal algorithm.

Figure 4 mainly analyzes the differences between the two intelligent algorithms in evaluating computer-aided English teaching information. Through Figure 4, it can be intuitively found that the global errors of the three information features of computer-aided English teaching have been greatly reduced. This shows that the introduction of the GRU method has improved the performance of artificial intelligence theory in evaluating computer-aided English teaching, and it also shows that both student expression information and student action information in the English teaching process contain relatively strong time information characteristics. This can better guide the relevant algorithms in the computer-aided system to evaluate and match English knowledge from the Internet. For information on computer-assisted English teaching, the error was reduced from 2.53% to 2.21%. For the English content of computer-assisted English teaching, the global error was reduced from 1.79% to 1.53%. The performance of student action feature evaluation is reduced from 2.66% to 2.27%. This fully demonstrates the effectiveness of the ACNN-GRU method in evaluating computer-aided English teaching.

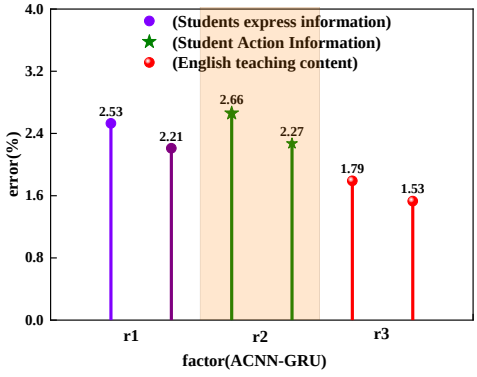

Figure 4: Global errors of computer-assisted English teaching information using hybrid ACNN-GRU.

4.2 Local Prediction Effect of Computer-Aided English Teaching Information

The local evaluation effect refers to the evaluation effect of individual English message individuals, which is only the performance on individual message data. It can see the differences and fluctuations of different individuals. In this study, 30 test sets of data on student expression information, student action information and English teaching information were selected for relevant evaluation. Figure 5 shows the effect of ACNN-GRU in evaluating student-expressed information in computer-assisted English teaching in the form of evaluation curves. It can be clearly seen from Figure 5 that there are many differences in the characteristics of students' expression information for 30 different test set data. This can explain two problems. First, the collection of computer-aided English teaching data sets has met the needs of generalization ability research. The degree of mastery has a clear relationship. The difference between the peak and trough values of information expressed by students in the computer-aided English teaching system is also relatively large. Figure 5 shows that the ACNN-GRU method can satisfy the student expression characteristics of evaluating computer-aided English teaching systems, although there are large gradients and large differences here. For actual English teaching, this kind of evaluation error distribution can also accurately grasp the characteristics of students' expression information.

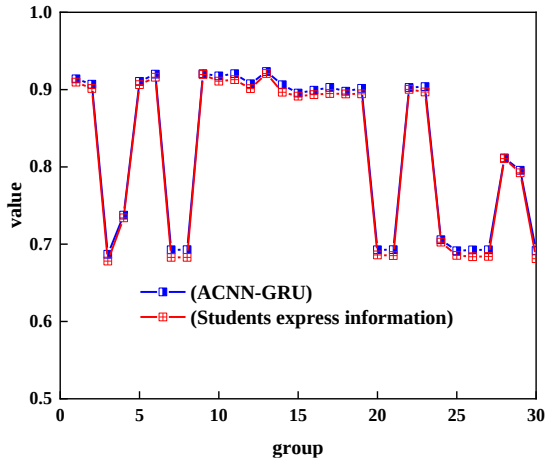

Figure 5: The evaluation curve of student expressive information in computer aided English teaching system.

Students' performance in English class can reflect students' ability to accept English knowledge and their mood, which is also crucial for learning English, which will ultimately affect the accuracy of students' communication. Figure 6 shows the effect of the ACNN-GRU method in evaluating student action information in computer-assisted English teaching in the form of an error area map. Most intuitively, it can be seen that the differences in students' action information in English classrooms are relatively large, which means that there are differences in the modes of students' knowledge transmission of computer-aided systems. If artificial intelligence theory can accurately evaluate students' action information, it can more accurately match English-related transmission knowledge from the Internet, which is the key to intelligent computer-assisted English teaching mode. It can also be seen from Figure 6 that the error area of ACNN-GRU in evaluating student action information is relatively small, and the distribution area of the error area is relatively uniform.

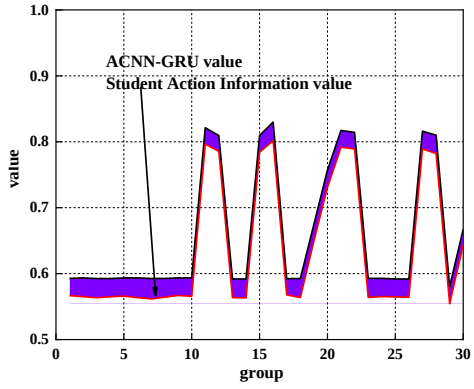

Figure 6: Evaluation curve of student action information in computer aided English teaching system.

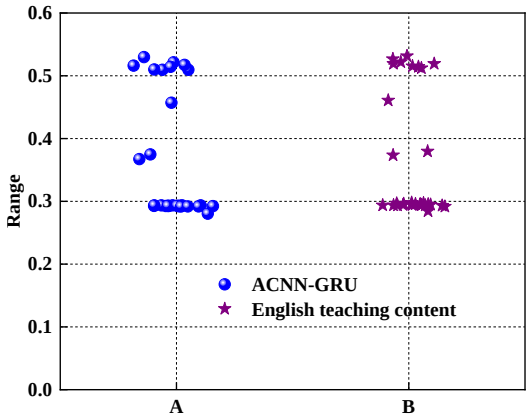

Figure 7: Evaluation of English content information in computer-assisted English teaching system.

The content of English teaching is to demonstrate to students the knowledge of English through computer-aided systems. It can contain English-related pictures, text, and videos. Figure 7 shows the effect of the ACNN-GRU method in evaluating English content information in computer-aided English teaching in the form of evaluation scatter plots. First, it can be seen from Figure 7 that there are two extremes of eigenvalues in English content information. This shows that there are differences in the English content transmitted in different English classrooms, and there are also many differences in the picture form and video form of the English teaching content. However, this did not affect the performance of the ACNN-GRU method in evaluating the English content of computer-assisted English teaching. The theoretical method of artificial intelligence can not only evaluate the eigenvalues of different English teaching information perfectly, but it can also evaluate the specific values of the English content of computer-assisted English teaching.

5 CONCLUSION

English plays an important role in international communication or international trade. People in different countries or regions have different language distribution due to differences in living customs, which has brought certain obstacles to the development of economic globalization. There are many countries where English is the mother tongue, and the mastery of English knowledge is relatively easy compared to other types of languages. In China, it has been carrying out English education for many years. In the early days, English knowledge was transmitted in the form of books, which has limited students' understanding of real English communication. With the addition of computer-aided systems to English subject education, students can learn English-related knowledge in the form of pictures or videos, which has promoted the vividness of English and the transmission of English knowledge. However, the current computer-aided English system has the defects of lack of vividness and lack of real-time content. This study uses the ACNN and GRU algorithms in the field of artificial intelligence to evaluate the characteristics of three aspects of student expression information, student action information and English teaching content information in the computer-aided English teaching system. The computer-aided English system can realize the interactive and real-time nature of English teaching with the help of artificial intelligence methods. It can match and evaluate relevant content of interest according to students' classroom expression behavior and action characteristics. Through research, it can be found that the ACNN-GRU method has higher accuracy than the single ACNN method in evaluating computer-aided English teaching. The highest error is only 2.27%.

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