Design of Intelligent Grading System for College English Translation

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Abstract. At present, the currently used intelligent scoring system for college English translation has the following defects in practical application: the running time is too long, and the final scoring result deviates greatly from the actual one. In view of this situation, in order to further reduce the manual participation in the scoring work, it is necessary to comprehensively improve the scoring efficiency and accuracy of the scoring result. Aiming at the above content, this paper studies and designs an English translation computer system with stronger scoring ability, hoping to provide a scientific reference for workers in the same industry.

Keywords: English translation · Intelligent scoring · system design

1 Introduction

The system of calculating English translation scoring needs to build a clear structure level, which mainly includes the function module of collecting the translated materials, effectively extracting the information features, constructing the analysis model and giving feedback and scoring to the results. During this period, it is necessary to set up a systematic English translation scoring module to form a more systematic language model, make statistics through the model, and summarize the details of the probability distribution according to the sequence features or word sequence features of a specific sentence in the translation. After that, it is also necessary to effectively combine the English translation documents given by users with their own translation training sets, and accurately extract the common information features between them; Finally, the system can accurately calculate the similarity of keywords according to the final extraction results, and then optimize the results by using particle swarm optimization. After that, the corresponding fitting calculation task is completed by BP network, and the accurate translation of target English is graded in the final stage.

2 Theoretical Research Basis

Under the background of the new era, the international economic situation has continuously made new development achievements, and with the widespread existence of

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international trade, English, a language with international versatility, has been paid more and more attention [3]. As far as college English learning is concerned, translation is an important component, which attracts great attention. Up to now, the English translation scoring system has started from the previous manual scoring mode to the semi-manual participation mode, that is, the combination of manual and computer intelligent scoring. Under such circumstances, the intelligent scoring system for English translation has become a key research topic in the current academic field, with a large number of experts and scholars participating in the research, and has achieved remarkable research results [7].

In the existing English translation scoring system, it is mainly based on Hidden Markov Model (HMM), combined with Witter's comparison system to input the translation, and then finally match the similar words in the translation, and then get the similarity between them, and then score according to the final comparison result [4]. However, this scoring system has a long working time, heavy workload, complicated analysis process and some defects in accuracy.

Based on a large number of experimental results, this paper develops a special design, records the final scoring results of the designed intelligent scoring system, and then compares the results with the manual scoring results, and finds that the minimum difference between them is 0.1. Therefore, this redesigned scoring system has a higher calculation accuracy, obviously exceeding the scoring system currently being used, and the overall scoring time of the system is less, obviously lower than that of the existing scoring system, and it is characterized by a more stable running state of the system.

3 Design Scheme of Intelligent Scoring System for English Translation

3.1 Setting the Internal Structure of the Translation Scoring System

Generally speaking, the existing English translation computers have a high consistency, and the main functional modules in their intelligent scoring system are: the module for collecting translated materials, the module for extracting system information features, the module for constructing system analysis model and the module for scoring final results feedback. Among them, the details of hierarchical relationships among different functional modules are shown in Fig. 1.

When the grading system is in the initial operation stage, all the captured translated materials can be included. At this time, the measures module can accurately input the English translated materials provided by the students, and then these materials will be uniformly processed by the inclusion module, and a standardized new format file, namely the system database file, will be formally generated.

With regard to the realization of the information feature function, it is necessary for the extraction function module to play its own role, divide all the data contents in the database file reasonably and carefully, and use the algorithm provided in the module software to realize the accurate extraction of the target file features to ensure the accuracy of the extracted data [6].

The system analysis model is the key component of scoring results, and the construction of its functional modules is particularly important. According to the final feature

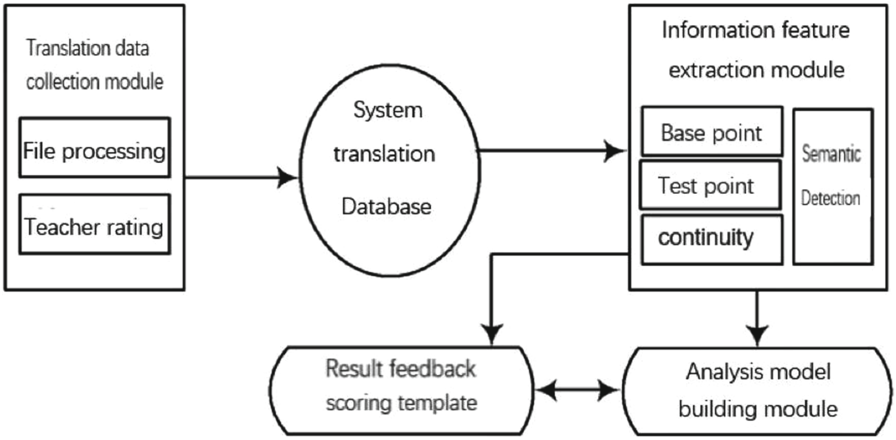

Fig. 1. Hierarchical diagram of internal structure of scoring system

extraction results of file data provided by the information feature extraction module, a targeted scoring model can be formulated, and then the final model file can be generated. On the basis of all the above, we can operate the result feedback function evaluation module, complete the final evaluation of the translated text, and provide the final feedback results.

3.2 Design Scheme of English Translation Scoring System

It is a necessary function of the scoring system to properly handle the captured natural language in a centralized way, and it is also a basic requirement for effective communication between people and computers, which is a key content that modern computers must pay attention to in the process of intelligent development [9]. As a scoring system with English translation function, this system mainly plays its own auxiliary role, and further realizes the interactive processing of various information. Detailed analysis of all levels of functional modules on the back of the computer scoring system structure can obtain the system architecture information of language processing functional modules, as shown in Fig. 2 for details.

The computer can upload the translation through its own user terminal, then carry out the necessary information interaction processing through the intelligent processing module in the computer, and input the data information into the English translation system of the corresponding system. Then, the scoring model will centrally process the received data information. In this process, the model file can also be used to centrally process the final scoring result and then send it to the user terminal [8]. During this period, the end button, which is manually responsible for review and evaluation, can also consult the English translation documents provided by users with the help of the information interaction function module, and accurately select the corresponding document conversion format for conversion, so as to ensure the accuracy of the translation set data captured by the training model, further improve the accuracy of the final scoring

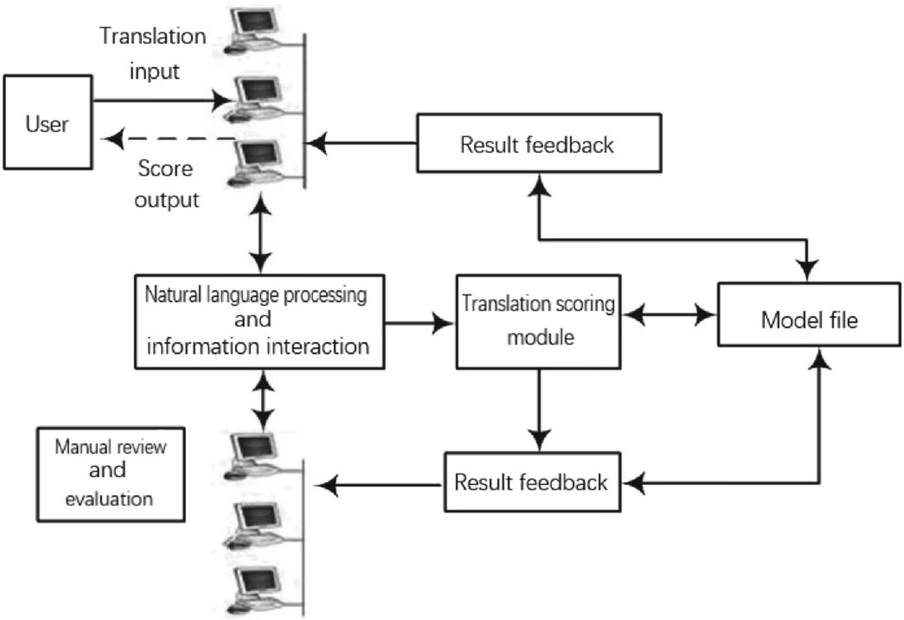

Fig. 2. Schematic diagram of translation scoring system architecture

result of the scoring module, and ensure that the overall working effect of the scoring system can reach the expected level.

4 The Functional Realization Scheme of English Translation Scoring System

4.1 The Language Model Adopted by the Translation Scoring System

The computer can perform effective statistical processing on the language model, and give the corresponding specific sentence sequence format or word sequence format of the translation, and show its probability distribution more clearly, thus further ensuring the application effect in the final stage [2].

In order to further simplify the calculation process and control the complexity of calculation, the ternary model can be introduced and applied in the system. Among them, it is necessary to set the priority set in the ternary language model, and the representative symbol is V. At this time, the basic form of ternary combination is (U, V, W), and the corresponding calculation parameters of this combination can be set to q (w|u, 0). At the same time, it is necessary to ensure that it meets $w \in v \cup \{ST0P\}$ standard, Us standard and $V \in UU$. Among them, when q (w|u, O) represents that the binary combination in the system is in a known state, and the probability of the word W after the word U and the word V appear at this time can be accurately captured. Therefore, it is more accurate to identify and calculate a single target sentence, such as: the probability distribution calculation formula of the ternary language translation model of x1x2…xn relation is as follows:

$$p(x_1x_2\ldots x_n) = \prod_{i=1} q(x_i|x_i - 2x_i - 1)$$

In the above formula, q(wl u, v) needs to meet the restriction conditions of the following formula, and the standard is:

$$q(w|u, v) \geq 0$$

After meeting the calculation requirements of the above formula, the maximum likelihood method can be used to estimate the results. At this time, q(wlu,v) calculated by the estimation algorithm can be finally solved. The details of the corresponding calculation formula are as follows:

$$q(w|u, v) = \frac{c(u, v, w)}{c(u, v)}$$

In the above formula: c(u, V, W) mainly represents the specific frequency of (U, V, W) that is processed centrally by the translation training module in actual calculation; At this time, C(u, v) belongs to the specific frequency accumulated in the translation training set in (u, v), and the estimation accuracy is extremely high at this time.

According to the specific frequency of different words, it is necessary to separately settle accounts. During this period, it is also necessary to distribute and calculate the actual calculation probabilities of the English translation documents provided by users and the standard translation sets in the system, and give the final calculation results, so as to extract and utilize the data information features of the English translation documents provided by users and the specific information features provided by the translation training sets again, thus further realizing the use requirements of the translation information feature extraction function module and ensuring that the feature extraction function can play its due role.

4.2 Phase Speed Computer English Translation Score

After verification of the above calculation process, it is found that the translation results of the documents provided by the end users are highly similar to the standard answers checked manually. At this time, key words are introduced to calculate the final similarity, and the details of the calculation formula of the final word similarity standard are as follows:

$$\text{sim Word}(A, B) = \frac{\text{Same}(A, B)}{\text{Num}(A) + \text{Num}(B)}$$

In the above calculation formula: sim Word (A, B) corresponds to sentence format, where A and B mainly represent the similarity between word forms; Where Same (A, b) mainly corresponds to the number of the same words contained in A and B in a sentence; Num (A) and Num (B) correspond to the number of English words in sentence A and sentence B, respectively.

Through the calculation of characteristic keywords, the word similarity measure standard can be obtained. After the particle swarm optimization algorithm is used for processing, the results need to be fitted and calculated by BP network. It is necessary to carry out comparative calculation according to the final calculation result and the initial set scoring standard, and then get the important translation result to be scored. At this time, the scoring result has higher accuracy, and then it can be calculated again according to the standard size of similarity value presented by keywords. And grab the error points of the English translation documents provided by users, and give targeted final comments, so as to realize the processing of English translation grading in the final stage, and at the same time ensure that the accuracy of intelligent grading and the feedback effect of the final result can reach the expected level [1, 5].

4.3 Analysis of System Test Results

To verify the final scoring results, we can set a special English translation format based on natural language processing, and ensure that the intelligent scoring system of the computer system can give full play to all aspects of its own computing performance. Therefore, we can achieve the purpose by means of simulation experiments.

At the end of the formal experiment, the platform system is Windows7, the host CPU frequency standard is set to 2.0 GHz, the host turbo frequency standard is set to 2.6 GHz, the host running memory standard is set to 6 GB, and the host storage space standard is set to 64 GB. After completing the host setting, you can complete the simulation experiment with the help of Matlab7.1, and draw the final result chart and table. Among them, the corresponding programming language for the system to execute the algorithm is mainly Visual C++. At the same time, it is also necessary to use the existing scoring system that has already designed and completed the system to carry out the synchronous test, and make a special manual scoring test method for both of them, so as to compare the accuracy of the final results of both of them. Here, the total score is set as 100 points, and then the final scores given by the two scores are respectively compared. The details of the experimental results are shown in Table 1.

In Table 1 DE corresponds to the documents to be graded; RM corresponding scoring method; RA, RB and RC respectively correspond to three test methods: different design systems, existing scoring systems and manual scoring. SC corresponds to the score, and the test unit is points, which are uniformly displayed with the letter C.

According to the data in Table 1, it can be known that the calculated results of the grading system designed this time are closer to those of manual grading, with the lowest difference being only 0.1 and the highest difference being 0.3c. After that, it is necessary to compare the design system with the existing scoring system, and analyze the running time of all scoring processes. The details of the experimental results are shown in Fig. 3.

In Fig. 3, RA and RB respectively represent the designed system and the existing scoring system.

From the content of Fig. 3, it can be seen that the fluctuation of the running time curve of this design system in the scoring process is small, which fully shows that this design system has better stability in actual operation. It can be seen that this design system has advantages in calculating the running time for the same content of the translation sample scoring task, and the required scoring calculation time is lower than that of the scoring

Table 1. Comparison of final scores of different scoring methods

DE	RM	SC/C
1	RA	87.4
	RB	84.7
	RC	87.6
2	RA	74.6
	RB	76.9
	RC	74.7
3	RA	72.6
	RB	69.8
	RC	72.9

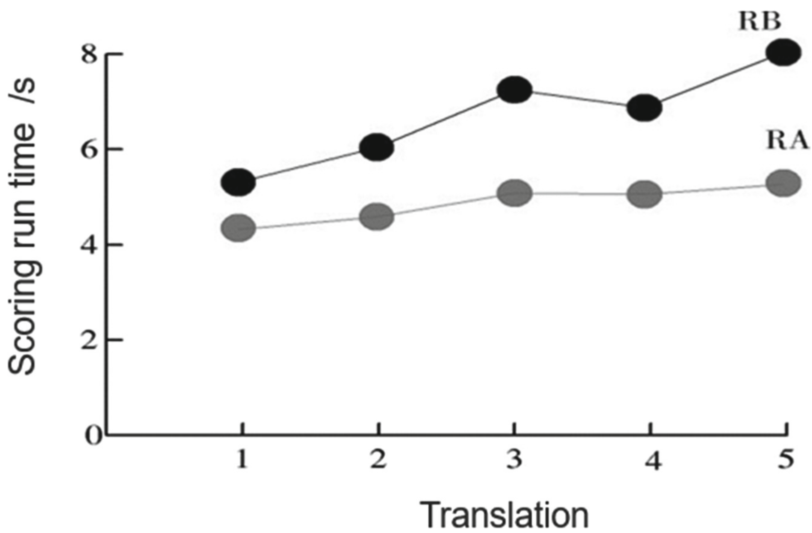

Fig. 3. Comparison chart of running time of scoring system

system currently in use. This result fully shows that this design system is more efficient, more accurate and more practical in scoring.

5 Conclusions

To sum up, this paper mainly takes English translation scoring as the main goal, redesigns the intelligent scoring system, successfully constructs its hierarchical structure with stronger system artiness, reasonably sets the modules with different functions at all levels in the system, and finally obtains the translation scoring results by combining the specific processes during the actual operation of the system modules, and explains the overall structure of the system. With the help of various related algorithms such as language models, the existing functional modules can be effectively applied. After the experimental results are obtained, it can fully show that the performance of this design system is obviously due to the traditional scoring system which is widely used at present, and it has research value and practicability.

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